

NR-304 - Energy efficiency and Demand Management Programme to mitigate projected national energy supply shortage

South Africa

NAMA for Recognition

A Overview

A.1 Party

South Africa

A.2 Title of Mitigation Action

Energy efficiency and Demand Management Programme to mitigate projected national energy supply shortage

A.3 Description of mitigation action

Eskom Holdings South Africa is one of the top 20 utilities in the world with a generation capacity of 41 194MW. It generates approximately 95% of the electricity used in South Africa and approximately 45% of the electricity used in Africa, providing the backbone that undergirds the stability and growth of many national economies on the continent.

After an extended period of excess generation capacity and very low electricity prices, South Africa ran into electricity supply constraints in 2007 when the growing need for electricity outpaced the rate at which power stations were being built. This resulted in the country experiencing repeated power outages from late 2007. Since then the ability to supply South Africa's electricity needs has remained a challenge and electricity supply is likely to remain vulnerable into the foreseeable future.

In 2004, Eskom officially launched its energy efficiency and demand-side management programme – it evolved over time to be established as the Integrated Demand Management (IDM) Programme under the auspices and guidelines of the National Energy Regulator of South Africa (NERSA). Although initially an initiative to predominantly create awareness amongst business and homeowners about the need and importance to use electricity wisely, it soon transformed into a strategic imperative of national importance aimed at demand and energy savings in response to the projected supply shortfall.

The objective of the IDM Programme was to produce a balanced demand reduction portfolio that would cost-effectively and timeously respond, as best as possible, to system requirements. It considered a wide range of solutions with programme implementation costs, energy and demand impact, sustainability, implementation lead times and the combined impact on the system profile top of mind. In doing this, a bespoke combination of energy efficiency, demand management and demand response measures were utilised.

The IDM programme encompassed the whole economy - but notably the commercial, residential and industrial sectors – and focussed on the broadest range of electricity end uses and technologies. Lighting, water heating, household appliances, pool pumps, pumping, heating and ventilation, process optimisation, compressed air, efficient motors and variable speed drives offered the most immediate opportunities for electricity savings.

In the early stages of the IDM Programme, demand and energy savings achievements were dominated by mass roll-outs in the residential sector. In addition, owing to South Africa's extensive mining sector and its relatively high consumption of energy, a large number of projects - specifically around pumping, process optimisation and

compressed air - were also implemented. It soon became apparent that smaller industrial and commercial businesses were unintentionally “excluded” from the programme as the structure of the funding models did not favour them.

An extensive innovation process then ensued and several more flexible funding models were developed and launched. Standard technologies with proven savings were offered in different options and payment was made only after realisation of expected savings. This caused a huge influx of projects to be registered under the umbrella of the IDM Programme and, more importantly, a much wider group of businesses began participating in energy saving initiatives. The new funding models, namely the Standard Offer and Standard Product programmes, also had a far less onerous approval process and contracts were awarded to customers much quicker.

In the residential sector mass roll-outs of Compact Fluorescent Lamps (CFLs) initially targeted lower income households. Over time, energy efficient Light Emitting Diode (LED) down-lighters became affordable for free issue and resulted in another innovative funding model, aimed at higher income households, being developed - the Residential Mass Roll-out Programme targeted homes that offered an opportunity for the installation of a range of energy efficient technologies.

The entire IDM programme was supported by a series of successful communication campaigns. All sectors of the market are targeted - the goal being long-term behavioural change that seeks to inculcate smart electricity use and energy efficient business and lifestyles whilst providing advice to customers on how to make the switch to energy-efficient technologies for a more sustainable and environmentally friendlier way of living and working.

A.4 Sector

- | | |
|--|---|
| ☒ Energy supply | ☐ Transport and its Infrastructure |
| ☒ Residential and Commercial buildings | ☒ Industry |
| ☒ Agriculture | ☐ Forestry |
| ☐ Waste management | |
| ☐ Other | |

A.5 Technology

- | | |
|---|--|
| ☐ Bioenergy | ☐ Cleaner fuels |
| ☒ Energy Efficiency | ☐ Geothermal |
| ☐ Hydropower | ☒ Solar Energy |
| ☐ Wind Energy | ☐ Ocean Energy |
| ☐ Carbon Capture and Storage | ☐ Low till / No till |
| ☐ Land fill gas collection | |
| ☐ Other | |

A.6 Type of action

- | | |
|--|--|
| ☒ National/ Sectoral goal | ☐ Project: Investment in machinery |
| ☐ Strategy | ☐ Project: Investment in infrastructure |
| ☐ National/Sectoral policy or program | ☐ Project : other |
| ☐ Other | |

A.7 Greenhouse gases covered by the action

- | | |
|---|-------------------------------|
| ☒ CO2 | ☐ CH4 |
| ☐ N2O | ☐ HFCs |
| ☐ PFCs | ☐ SF6 |

☐ Other

B National Implementing Entity

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B.1.8	Email	
B.1.9	Contact Person 3	
B.1.10	Address	
B.1.11	Phone	
B.1.12	Email	
B.1.13	Comments	

[Add Additional Entity](#)

C Expected timeframe for the implementation of the mitigation action

C.1	Number of years for completion	10
C.2	Expected start year of implementation	2004

D Currency

D.1	Used Currency	ZAR ▼
Conversion to USD: 0		

E Cost

E.1.1	Estimated full cost of preparation	900
Conversion to USD: 97		

E.1.2 Comments on estimated full cost of preparation		Since the inception of the IDM programme in 2004 total demand savings of 3 990MW have been realised and R10,210.32 million spent over the same period, which translates into a very favourable funding rate of Rmill 2.56 / MW. At the current rand / US\$ exchange rate of 11.09 (as at 20/10/2014) this equates to US\$ mill 0.23/MW. This is largely due to the relatively low cost of replacing incandescent light bulbs with energy efficient lamps in the residential sector. Data compiled by the US Department of Energy's Energy Information Administration showed that Eskom's IDM Programme has been extremely cost-effective when compared with the 10 US utilities that spend the most on reducing electricity consumption. According to the administration's latest available (2012) statistics, the cost of saving a single megawatt (MW) incurred by the ten top-spending US utilities ranged between US\$0.88 million and US\$3.11 million and, in one case, \$75.83 million per megawatt. By comparison, Eskom's IDM Programme achieved savings that cost the equivalent of just US\$ 0.53 million per MW.
E.2.1	Estimated full cost of implementation	900 Conversion to USD: 97
E.2.2	Comments on estimated full cost of implementation	Since the inception of the IDM programme in 2004 total demand savings of 3 990MW have been realised and R10,210.32 million spent over the same period, which translates into a very favourable funding rate of R 2.56 million/ MW. At the current rand / US\$ exchange rate of 11.09 (as at 20/10/2014) this equates to US\$ mill 0.23/MW. This is largely due to the relatively low cost of replacing incandescent light bulbs with energy efficient lamps in the residential sector. Data compiled by the US Department of Energy's Energy Information Administration showed that Eskom's IDM Programme has been extremely cost-effective when compared with the 10 US utilities that spend the most on reducing electricity consumption. According to the administration's latest available (2012) statistics, the cost of saving a single megawatt (MW) incurred by the ten top-spending US utilities ranged between US\$0.88 million and US\$3.11 million and, in one case, \$75.83 million per megawatt. By comparison, Eskom's IDM Programme achieved savings that cost the equivalent of just US\$ 0.53 million per MW.
E.3.1	Estimated incremental cost of implementation	0 Conversion to USD: 0
E.3.2	Comments on estimated incremental cost of implementation	

F Estimated emission reductions		
F.1	Amount 	47 million tonnes of CO2
F.2	Unit	MtCO2e 
F.3	Additional information (e.g. if available, information on the methodological approach followed)	The environmental benefits from energy efficiency measures are widely recognized, but are more pronounced in South Africa, where the electricity mix has a high carbon intensity. The IDM programme saved 47 million tonnes of CO2 and 64 million kilolitres of water from 2004 to March 2014. Relative to an annual water requirement for South Africa estimated in 2000 at 13,28 billion kilolitres and taking the minimum water requirement per person as 25 litres per day, the water savings since inception to date would be able to supply 7 million people with water for a year.

G.1 Other indicators of implementation

Since the launch of the IDM Programme in 2004 until 31 March 2014 the key implementation achievements have been the following:

Savings Realised

- Total demand savings of 3 990MW have been realised. This is equivalent to that of an average power station in South Africa or to a full year's electricity consumption by Pretoria, the country's capital city.

Main Initiatives

- The most successful demand reduction and energy savings achievement by far was extensive **mass roll-outs** of specific technologies in the residential sector. More than 60 million incandescent light bulbs were replaced with energy efficient lamps in the Residential sector. Of these, in excess of 56 million lamps were distributed as part of a mass roll out exchange programme. The verified demand reduction associated with the CFL programme alone is 2,357 MW. A research report found that this roll-out is one of the largest energy efficiency programmes in the world, quite possibly the largest yet – exceeding 23.9 million CFLs installed in Mexico, 25 million in India (out of a planned 400 million) and 13.5 million in the United Kingdom.
- The solar water heating system installation programme, conducted in partnership with the Department of Energy, has exceeded 381 000 thousand units. This represents an installed capacity equivalent to the total solar water heating capacity in the rest of Africa. In addition, at 18% per annum, South Africa's solar water heating market is growing faster than those of almost all other countries in the world. China is the exception – their solar water heating market grew 29% between 2012 and 2013.

The solar programme alone reported 8 063 direct employment opportunities at companies who have registered for participation in the 2011/12 and 2012/13 financial years. Insurance companies now also offer assistance to homeowners to replace burst electrical element geysers with solar water heating systems. It is, therefore, expected that this relatively new solar market will continue to grow in South Africa into the future.

Supporting Marketing Campaign

- A crucial element of the Communications Campaign is the Power Alert system - aimed at the residential sector. It is an interactive media control system designed to empower households to assist and participate in reducing electricity use on weekdays between 17:00 and 21:00. Broadcasting Power Alerts on national television during this critical time - colour coded messages that inform the public about the state of the system - households are encouraged to switch off non-essential lights and appliances to achieve an immediate energy reduction when they see an alert on television. Whilst these savings are not sustainable and rely on human behaviour, the initiative has proven hugely beneficial when the national grid experienced severe strain.
- Supporting the Power Alert system, other ongoing marketing campaigns aimed at the residential sector include specific initiatives such as Winter and Summer, Holiday campaigns, to name a few. The commercial sector - retailers, banks, hospitality establishments, hospitals and property owners - were exposed to "green"

workshops and conferences and have, as a result, partnered with Eskom to achieve sustainable energy savings. The commercial and industrial sectors have also been targeted through energy efficiency 'edutainment' road shows on business premises. Moreover, assistance with establishing 'in-house' energy savings programmes in businesses are supported and facilitated by Eskom

International Recognition

In a recent meeting the World Bank noted that South Africa, driven by Eskom, has been a leader in utility energy efficiency and it is always mentioned as international best practice on energy efficiency and demand side management.

H Other relevant information

H.1

Other relevant information including co-benefits for local sustainable development

I Relevant National Policies strategies, plans and programmes and/or other mitigation action

I.1 Relevant National Policies Regulatory Policy for Energy Efficiency and Demand Side Management for South Africa 2013

I.2 Link to other NAMAs (none)
Sustainable Housing Programme
High Integration Program of Wind Energy
Implementation of a National Forestry and Climate Change Strategy, including the development and implementation of a Platform for the Generation and Trading of Forest Carbon Credits.

J Attachments

J	Attachments	Title Description	
		No records to display.	
J.1	Attachment description		
J.2	File	Choose File	No file chosen

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