

# Energy Management News



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## Developing long term mitigation scenarios for South Africa: 2006 to 2007

### INTRODUCTION

Climate change is one of the greatest threats to our planet and to our people. South Africa is especially vulnerable to the impacts of climate change. At the same time, South Africa emits high quantities of greenhouse gases (GHG), which are causing climate change: in fact, our country is one of the highest emitters per capita per Gross Domestic Product (GDP) in the world. We are helping to cause the problem and we are also its victims.

Reducing emissions of greenhouse gases is called mitigation. Responding to the impacts of climate change is called adaptation. The proposed Long Term Mitigation Scenario Process refers primarily to this activity. A certain amount of adaptation will be necessary, no matter what we do. But it is also true that there will come a point where it will not be possible to adapt our way out of the problem.

South Africa is an active participant in the international process of combating climate change and regulating the emissions of greenhouse gases. We are signatories to the United Nations Framework Convention on Climate Change (UNFCCC) as well as the Kyoto Protocol. We take the issue of climate change very seriously and have shown world leadership in the UN negotiations. Our actions must also speak as loudly as our words in the negotiations, and we need to show leadership by example. This we can do by preparing a course of action for our country.

Under the Kyoto Protocol, at least

until 2012, we, together with most developing countries, have no binding greenhouse gas mitigation obligations. However, this is likely to change sometime after 2012, and it means that at some point South Africa will be required to start cutting its emissions. South Africa is in fact already formulating plans to reduce GHG emissions.

Over the next number of years in the negotiations, South Africa will be required to engage deeply with the issue of mitigation obligations. We will need to be ready and prepared, armed with a detailed plan and sets of negotiation positions. This plan will have to contribute to the international effort to lower emissions, while meeting the development needs, especially of our poorer communities. We need to connect energy needs, mitigation plans, and policies such as the Accelerated and Shared Growth Initiative. We need to accurately determine the costs, benefits, and opportunities for mitigation activities. We will choose a time horizon of both 25 and 50 years, which are fair time frames for medium and long term planning when we speak of power generation, as well as for other emission sources such as from industry, transport and housing.

### SCENARIO PLANNING

Mitigation is a delicate balance between development needs, available technology, cost to the economy, and policy intervention. South Africa has the opportunity to proactively define approaches and development

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paths that we – as a society – consider desirable. We cannot, for example, agree to a mitigation target which we cannot afford and will not reach. At the same time, there is a huge opportunity for international investment in climate-friendly technology, which can help us grow more and create new industries. In other words, we need to work out a range of paths which work for our country. This includes all major emitters: our electricity utility, our private sector, and our public sector.

In order to determine these paths, our cabinet has decided that what is needed is a national process of building scenarios of possible futures, informed by the best available research and information. This will help South Africa to define, not only its position on future commitments under international treaties, but also shape its climate policy for the longer-term future.

Stakeholders from government, business and civil society agreed at the National Conference in October 2005 to embark on this process, seeking to protect the climate while meeting the development challenges of poverty alleviation and job creation.

Scenario planning has already been influential in our history and has proved its ability as a process to shape policy and other choices. A scenario is a structured account of a possible future. A scenario describes a future that could be rather than one that *will* be. A group of scenarios are alternative dynamic stories that capture key ingredients of uncertainties of the future. They reveal the implications of current trajectories, thus illuminating options for action. These options for action are then presented to government in order to assist it in making the correct policy choices.

### THE METHOD

From June 2006, and for a period of about 18 months, we will put together a Scenario Building Team which will develop the Scenarios. The Team will be made up of directly interested stakeholders from the country's major emitters, from government, as well as from other interested parties. A careful process of stakeholder selection will ensure that the team contains the correct people for the task. The team will be facilitated by expert independent process facilitators with international experience in Scenario Building and climate change issues. The Team will be supported by four Research Units, cov-

ering Energy Emissions, Non-Energy Emissions, Macro-Economic Modelling, and Climate Change Impacts. These support Units will contain our leading researchers.

The Scenario Building Team will start building the Scenarios based on research information and internal data later in 2006. The Team will build its own rules, which are likely to include strict principles regarding confidentiality and protection of proprietary information.

The final report of the Team will be made public.

### WHO IS INVOLVED?

The Department of Environment and Tourism (DEAT) as the focal point for climate change in South Africa will convene and manage the process, which will be overseen by an inter-ministerial group. DEAT has appointed the Energy Research Centre (ERC), University of Cape Town, to project manage the entire process. The ERC is undertaking the task of convening and contracting the process specialists and ensuring their independence. Similarly it is setting up the personnel of each of the four Research Support Units.



Energy Research Centre  
UNIVERSITY OF CAPE TOWN



DEPARTMENT OF  
ENVIRONMENT  
AND TOURISM

### OBJECTIVES

The desired objectives of the proposed process are:

- South African stakeholders understand and are focused on a range of ambitious but realistic scenarios of future climate action both for themselves and for the country, based on best available information, notably long-term emissions scenarios and their cost implications;
- The South African delegation is well-prepared with clear positions for post-2012 dialogue;
- Cabinet can approve (a) a long-term climate policy and (b) positions for the dialogue under the United Nations Framework Convention on

Climate change; and

- Cabinet policy based on the scenarios will assist future work to build public awareness and support for government initiatives.

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# Cape Town's energy and climate change strategy

In August 2006, Council of the City Of Cape Town endorsed the Energy and Climate Change Strategy document. This document will now inform the City's decision making with regard to Energy Efficiency and Renewable Energy impacts in all spheres of City activity. The Strategy is aimed, in the long term, at making Cape Town a sustainable City and in more immediate terms, in starting to address our responsibility with regard to climate change.

The Energy and Climate Change Strategy is based on the Integrated Metropolitan Environmental Policy, which was accepted by Council on 31 October 2001 and has the following aims:

- reduce man made causes of climate change
- identify communities and ecosystems most vulnerable to climate change impact
- minimise these impacts
- integrate sustainable energy approaches in core city functions
- establish a framework that provides a clear vision and direction

Cape Town is the first city in Africa to have completed a State of Energy report. This formed the basis for the establishment of an Energy and Climate Change Strategy.

In the Energy and Climate Change Strategy, the objectives of the Integrated Metropolitan Environmental Policy have been expressed in the form of five visions. The City aims to bring these visions to fruition by setting specific targets and by implementing projects geared towards achieving the set targets as follows:

## **Vision 1: Access to appropriate, affordable, safe and healthy energy services for all**

In Cape Town, energy demand is predominantly for electricity, petrol and diesel. Demand for paraffin, liquid

petroleum gas (LPG), coal, heavy fuel oils and wood represent a minor proportion (11%). Our economy, due to its lower industrial activity, is less energy intensive than that of the rest of South Africa. Our supply of energy is derived from electricity (approximately 70% from Koeberg, the rest from Mpumalanga via transmission), from liquid fuels locally refined (15% of national demand), from coal and from gaseous fuels, mostly LPG (25% of national demand) with natural gas a reluctant player still hiding offshore.

## **Vision 2: Meeting the city's energy needs in a sustainable manner**

This can be achieved with renewable energies such as wind generated electricity (from Klipheuwel, soon to be established Darling and one hopes further development of wind farms in the Western Cape area). In the longer term, future wave and ocean current derived electricity generation may become possibilities. Other technologies such as solar water heating and Bio-fuels are immediately available and near future solutions.

## **Vision 3: Efficient use and management of energy in all sectors**

A pilot project on energy efficiency in two municipal buildings has shown potential and is to be rolled out to more municipal buildings in due course. Replacement of traffic signal light sources with LED lighting when required is already underway, with more efficient street lighting still to receive attention.

Contribution of residential households to CO<sub>2</sub> emissions varies between 60 kg per month to 750 kg per month depending on the household. In these, efficiency gains of 20% to 30% may be had from solar water heating, 10% from efficient lighting (largely accomplished under Eskom's 2006 winter load avoidance campaign in the Western Cape)

and 10% from change in user habits. Thermally efficient home design promises a moderate 5% gain in the South African context.

Within Commerce and Industry, 77% of all electricity is used in industry, with 14% used in office blocks, whilst hospitals and shopping malls account for 4% each. Efficiency gains will be sought with an energy efficiency implementation plan, energy audits, a green building initiative and promotion of cleaner production initiatives. A green rating system is to be developed.

A pilot project in two municipal buildings has shown potential for energy saving and is to be rolled out to further municipal buildings and buildings of other authorities.

Switching from incandescent to LED based lighting in traffic signals when replacement is required is already under way, and efficient street lighting is still to be addressed.

## **Vision 4: An equitable transport system, based on public transport and compact city planning**

A pilot project converted a small number of municipal petrol vehicles to the use of LPG, a cleaner fuel. This was successful, but unfortunately, the recent disproportionate rise in the LPG price has not been to the program's benefit. Bio diesel and bio ethanol are two exciting fuel replacements about to enter the arena.

Bicycle and pedestrian transport is to be encouraged under the Non-Motorised Transport Strategy by 2015 and a Transport Forum is to be established involving Local, Provincial and National authorities.

Rail transport should be prioritised for improvement to unlock the true value of the existing infrastructure (it should form the backbone of the city's transport system) and bus corridors and taxi lanes, although not successful at present, could make a positive con-

tribution if their priority and use is properly enforced.

Reversing the urban sprawl inherited from the apartheid era with "Compact City" planning and improvements in inner city public transport may allow the use of disincentives to private vehicle use in the inner city, easing congestion and enhancing transport efficiency.

**Vision 5: Provision of energy in support of economic competitiveness and increased employment**

This vision will be served by the targets and projects under the other four visions.

Thus, it can be seen that the path to sustainability for the City may be achieved. This would be by way of reducing our dependence on Fossil Fuels by introducing cleaner fuels (such as Natural Gas) when and where feasible, through promoting the increased use of Renewable Energy, focussing on Energy Efficiency, by switching the Economic Development Paradigm from increased resource use to efficient resource use. In turn, efficient, safe and convenient Public Transport could be provided, and finding and using cleaner alternatives to current Transport Fuels.

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## Streetlight project for Oudtshoorn Municipality

The national energy saving initiative under the auspices of the Department of Minerals and Energy (DME) mandated the National Energy Regulator of South Africa (NERSA), who appointed Eskom Demand Side Management (DSM) as part of the national strategy to define and manage the underlying responsibility of industries in South Africa to control MW supply throughout our country aimed to have a positive impact on the MW energy shortage projected by 2007. It is estimated that by 2007 South Africa will be faced with a critical shortage of electricity supply during peak times due to the growing demand and insufficient load capacity.

Over and above the need for saving uncontrolled parameters of kW energy currently consumed, which not only contributes to valuable energy wasted, high intensity discharge (HID) streetlights contribute to unnecessary kW/hour expenses paid for, resulting in an unnecessary financial obligation.

Oudtshoorn Municipality appointed Ma'emsas as Energy Services Company (ESCO) who identified Oudtshoorn as the first municipal energy efficiency demand side management (EEDSM) streetlight project to apply their unique world renowned accredited lighting energy technology, saving unnecessary consumed kW energy currently used for streetlights. The technology has proven a guaranteed savings of 25% on the streetlight kW/h energy consumption in Oudtshoorn, Deyselsdorp and De Rust, and was approved by Eskom DSM as an EEDSM project and funded partly by the NERSA energy efficiency fund.

Oudtshoorn Municipality is proud to announce that another corner stone has been laid by the successful implementation of this EEDSM strategy and contribution to the DME Energy Efficiency policy for South Africa,

and trust that many other municipalities who are faced with the same energy management challenges will learn from them in this regard contributing to the over all challenge we have in South Africa.

This EEDSM project emanates a saving of one million one hundred kW hours (1 100 000 kW/h) of the four million kW hours (4 000 000 kW/h) consumed by the 7 500 streetlights in the Oudtshoorn, De Rust and Deyselsdorp area per annum. The Oudtshoorn Municipality will be saving approximately R152 000 per annum using the Ma'emsas Lighting Energy Controller technology deployed. The Operations Department of Ma'emsas is further contracted to support the technology for 5 years ensuring that energy efficiency is applied throughout the period.

This launch is a memorable occasion for the first EEDSM Streetlight energy control technology deployed successfully in Southern Africa initiated by the Town Electro Technical Manager, Mr Johan Nel, and his department as the contribution by the Municipality to the Energy Efficiency strategy of the DME, NERSA and Eskom DSM. This launch further pledges the commitment, successful deployment and ongoing contribution to the energy efficiency strategy implemented by a municipality supporting the National Strategy of the Department Minerals and Energy.

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From left to right is: Francois Kriel (CEO – Ma'emsas), Councillor Dianne de Jager (Acting Mayor of Oudtshoorn), Chwalo Setiloane (Strategic Director – Ma'emsas), Councillor Mervin May (Municipal Manager – Oudtshoorn)

## Proposed peaking power plants for Eastern Cape and KwaZulu-Natal

The Department of Minerals and Energy (DME) has released the draft scoping report for the proposed peaking power plants in the Eastern Cape. The proposed plant generation capacity is 500 MW. It will be established in the Coega Industrial Development Zone (IDZ) and forms part of the \$1-billion project spearheaded by the DME to establish two peaking power plants in the Eastern Cape (and KwaZulu-Natal), owned by independent power producers (IPPs), with a combined power output of around 1050 MW. The Eastern Cape peaking power plant will use three open cycle gas turbines. The plants will be used to augment the electricity supply into Eskom's transmission system during peak demand periods.

The draft environmental scoping report (ESR) focused on the potential biophysical, social and economic impacts and issues associated with the development of the peaking power plant in the IDZ, and included some recommendations for a more detailed assessment to be included in the environmental impact assessment (EIA) phase. In addition, the draft ESR states that the EIA phase would also look into associated road-traffic impacts during the construction period and thereafter on the fuel and water deliveries.

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www.eims.co.za/projects/PPP\_KZ\_N/Final\_SR/SdP\_0553A\_Final%20SR.pdf (Scoping report for the KwaZulu-Natal power plant)*

## Ma'emsas EEDSM launch in Knysna

The Honourable Dr. Cole, Executive Mayor of Knysna Municipality, proudly launched the EEDSM streetlight project, the second of its kind in South Africa on 26 July 2006. The national energy saving initiative under the auspices of the DME mandated NERSA, who appointed Eskom DSM as part of the national strategy to define and manage the underlying responsibility of industries in South Africa to control MW supply throughout our country, with the aim to have a positive impact on the MW energy shortage projected by 2007.

Knysna Municipality recognised this EEDSM streetlight project to save the uncontrolled parameters of kW energy currently consumed by its streetlights, and to contribute to the cause in saving valuable energy currently wasted. HID streetlights contribute to unnecessary kW/hour expenses paid for, contributing to an unnecessary financial obligation of municipalities.

Ma'emsas Energy Services Company (ESCO) was appointed by Knysna Municipality, and identified Knysna as one of the first municipal energy efficiency demand side management (EEDSM) streetlight projects to qualify in using this unique world renowned accredited lighting energy technology. The deployment of this technology has proven savings of 25% on the streetlight kW/h energy consumption in the Knysna and Sedgefield area. The project was approved and partly funded by the NERSA energy efficiency fund as one of the first EEDSM projects on streetlights.

The Knysna EEDSM project emanates a saving of 162 kW (761 777 kW/h) of the 3 047 109 kW hours consumed by the 3 647 street and high mast lights in the Knysna and Sedgefield area. The Knysna Municipality will be saving approximately R114 267 000 per annum using the LEC technology deployed by Ma'emsas. The operations department of Ma'emsas is further contracted to support the technology for 5 years, ensuring that energy efficiency is applied throughout the period.

This launch is another memorable occasion for one of the first EEDSM

Streetlight energy control technology deployed successfully in Southern Africa initiated by the Town Electro Technical Engineer, Mr Len Richardson, and his department as the contribution by the municipality to the Energy Efficiency strategy of the DME, NERSA and Eskom DSM.

At the launch a pledge of commitment was signed by the Municipality, Barry Bredenkamp, of the new founded National Energy Efficiency Agency of the DME and Ma'emsas to hallmark their commitment to the ongoing contribution to the National energy efficiency strategy of the DME and the successful deployment thereof.

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*On the left, the CEO of Ma'emsas, Mr. Francois Kriel, the Strategic Director of Ma'emsas, Mr. Chwano Setiloane, and on the right, the Honourable Executive Mayor of Knysna Municipality, Dr. Joy Cole, receiving a certified memorabilia commemorating the launch*

# The 'future of oil' revisited: is the peak nigh?

## INTRODUCTION

In the June 2005 edition of this publication, Peter Vernon sparked a debate on the future of oil with an article summarising the views of American academic and author, Richard Heinberg. Heinberg paints a grim picture of life after global oil production peaks and enters terminal decline. Vernon himself considers Heinberg's view to be worthy of consideration, but perhaps overly pessimistic, especially regarding the effects of future technological progress. The September 2005 issue of *Energy Management News* contains replies from Dr Philip Lloyd and Dr JC Nkomo, both of whom appear to be optimistic regarding the prospects for future oil supplies.

As a development economist aware of the centrality of oil in modern society, I am keenly interested in the future demand, supply and price of oil and their economic, social and political implications. This contribution addresses some of the issues raised by Vernon, Lloyd and Nkomo, and aims to provide additional details of the so-

called 'peak oil' debate. Space constraints do not permit a thorough discussion of the important issues of alternative energy sources, the possible consequences of oil depletion, and what could or should be done about them. My intention is to prompt further contributions to this lively and important debate.

## RESOURCES AND RESERVES

Both the physical amount of oil existing in the Earth's crust (resources) and that subset which is economically accessible for production (reserves) are – from a human time perspective – finite. This is because crude oil deposits were formed over millions of years (and mostly tens or hundreds of millions of years ago) by the decaying, compressing and heating of plant and animal matter. (The so-called 'abiotic' oil theory, according to which oil is not derived from organic matter, has no plausible evidence.) Thus, despite the fact that as the price of oil rises, a higher proportion of resources become reserves (since it is economic to exploit them), the quantities of both oil resources and reserves are ultimately finite, and no price level can change this.

Given that oil reserves are finite, there are three pertinent questions to ask. (1) How much oil remains to be produced? (2) How long is it likely to last? (3) What will happen to the price of oil over the coming years?

As Lloyd states, estimates of so-called 'proved' or 'official' reserves of conventional oil have been rising steadily over the past couple of decades. This trend apparently reflects new discoveries over time and the fact that historical reserves are frequently revised upward as more advanced technologies allow 'enhanced recovery', i.e. a greater percentage of the oil in old wells to be extracted. However, the reliability of official reserve estimates is contestable on several counts.

First, as Vernon notes, these figures are aggregated estimates from individual oil-producing countries, which are not subject to independent audit, and are thus vulnerable to manipulation for political-economic reasons (such as bargaining power or collateral for loans).

Second, official reserve estimates for many countries – as published in periodicals such as *World Oil* and *Oil & Gas Journal* – often reflect no changes from year to year, despite the fact that

these nations were pumping oil and may or may not have been making any new discoveries.

Third, in their 1998 article in *Scientific American*, Campbell and Laherrère pointed out that six members of the Organisation of Petroleum Exporting Countries (OPEC) revised their proved reserves upward by between 40 and 200 per cent between 1985 and 1987, accounting for most of the impressive-looking jump in world reserves during that period. This occurred shortly after two notable events circa 1985: (1) the collapse in oil prices to around \$10 per barrel; and (2) OPEC's decision that production quotas would henceforth be based on proved reserves. Cash-strapped countries that were highly dependent on oil revenues therefore had every incentive to inflate their reserve estimates. Moreover, Figure 1 shows that the last major spike in oil discoveries occurred in the mid-1970s; by contrast, discoveries in the early 1980s were actually muted and inconsistent with the OPEC revisions. Campbell and Laherrère's argument has been bolstered by certain Kuwaiti officials' admission early this year that their proved reserves stand at around 48 billion barrels (Gb), in contrast to the official figure of 99 Gb.

Fourth, Matthew Simmons, an independent energy consultant and former advisor to the Bush Administration, argues in his book *Twilight in the Desert* that Saudi Arabia's oil reserves are substantially over-estimated. He claims that the Saudis have been over-pumping their oil wells, which means that the final gross quantity of oil that can be extracted will be significantly less than previously estimated. In recent months, Saudi production has declined by some 400 000 barrels per day, despite sky-high prices. While it is too early to tell whether this development confirms Simmons' warning, it is commonly acknowledged that Saudi Arabia no longer has spare production capacity.

Finally, early in 2004 Royal Dutch/Shell embarrassingly downgraded its proved reserves by 20 per cent (one of four downward revisions). These revelations cause one to wonder how pervasive inaccurate reporting is in the industry. At the very least, a great deal more transparency is required before we can be confident in the official figures.

Issues such as those raised above partly explain the wide divergence

among geologists' estimates of ultimately recoverable oil. These range, for example, from the pessimistic estimate of 1900 Gb by the Association for the Study of Peak Oil and Gas (ASPO) to the optimistic 3 003 Gb of the United States Geological Survey's (USGS).

### HOW LONG WILL OIL LAST?

The second question posed above, namely how long will oil last, obviously depends on the extent of ultimately recoverable reserves, as well as rates of production and consumption. The conventional view rests on the reserve to production ratio (R/P), which – based on the official reserve estimate of 1 200 Gb – is currently in the region of 40 years.

For several reasons, however, the R/P ratio at best has limited usefulness, and at worst can be misleading. In the first place, it obviously depends on the (dubious) reliability of proved reserve estimates. Even if the 40-year R/P figure is roughly accurate, a little more than one generation is not a great span of time if one is concerned about inter-generational equity and sustainable development.

Second, even if the historical figures showing an upward trend in reserves are accurate, this does not logically imply that the R/P ratio will continue to rise indefinitely. The crux of the matter is the trend in discoveries and potential future reserve growth, which are discussed below.

Third, oil production will not remain flat for 40 (or whatever) years and then suddenly collapse to zero. Both geologically and economically, such a pattern of production would be impossible, for it says nothing about the way production from oil wells gradually declines after reaching a peak or plateau, nor about how prices and demand will respond to diminishing supply and/or increasing demand.

### THE 'HUBBERT CURVE'

The methodology developed by M. King Hubbert in the 1950s arguably presents a more realistic theoretical analysis of the evolution of oil production, and in addition is well supported by factual evidence. The Hubbert curve methodology rests on the obvious point that you can only produce what you have discovered. If discoveries rise to a peak and then fall, then surely production will follow a similar trajectory. Historically, the global rate of oil discoveries peaked in the 1960s (see Figure 1).

Given the extent of exploration to date, some geologists deem it highly unlikely to reach those rates again in the future. As Vernon reported, Hubbert correctly predicted the USA's production peak in the early 1970s. To date, more than half of the 44 most significant oil producing nations have passed their peaks. And according to Figure 1, global production has exceeded new discoveries every year since 1981.

A few common misconceptions about the Hubbert curve analysis need to be addressed. First, 'peak oil' adherents are not saying that we are about to run out of oil – the 'Hubbert Peak' occurs when roughly half of the oil has been extracted.

Second, the Hubbert curve *does* take account of the economic dimension of oil exploration, production and consumption, and not just the availability of supply. Initially, costs are low, profits high, and production increases rapidly. But as individual wells are depleted, the rate of flow will at some point diminish and the costs of extraction will rise. Also, the most accessible oil fields tend to be discovered and exploited first, followed by increasingly difficult and costly fields.

Third, Hubbert curve analysis is not 'static', as projections are revised in the light of new oil discoveries. For instance, ASPO adjusted its projected peak of all petroleum liquids from 2007 to 2010 when significant deep-water discoveries were made in the past two years. So, the big question is whether significant future discoveries will be made. Once again, there are substantial disagreements between optimists and pessimists.

### RESERVE GROWTH AND ALTERNATIVE SOURCES

Economists, among others, correctly point out that higher oil prices tend to stimulate increased exploration activity. However, more *exploration* does not automatically convert into significant new *discoveries*: it depends on the extent to which undiscovered oil fields still exist. Again, opinions on this matter vary greatly, even among geologists. Pessimists (such as Colin Campbell) argue that over 90% of recoverable oil has already been found, while others (such as the USGS) are sanguine about the prospects for future finds.

Figure 1 shows the declining trend in oil discoveries since the 1960s. The argument is commonly made that discoveries in the 1990s were low because oil was relatively cheap and hence exploration activity was unprofitable. But the price was also low (in both real and absolute terms) in the 1950s and 1960s when most of today's known oil reserves were found. Furthermore, the oil price has been rising steadily since 1999, and as yet there have only been a couple of substantial finds, in Kazakhstan and in deep water off the West African coast.

Historically, while some 50 000 oil fields have been discovered, nearly half of all the oil found was contained in the forty largest oil fields. The chances of more mega-fields being discovered seem remote, since these are the ones which are generally found early on. The one major exception, on which the optimists' hopes are apparently pinned, is that further mega-fields will be discovered in deep water or polar regions. But even if these hopes materialise, such

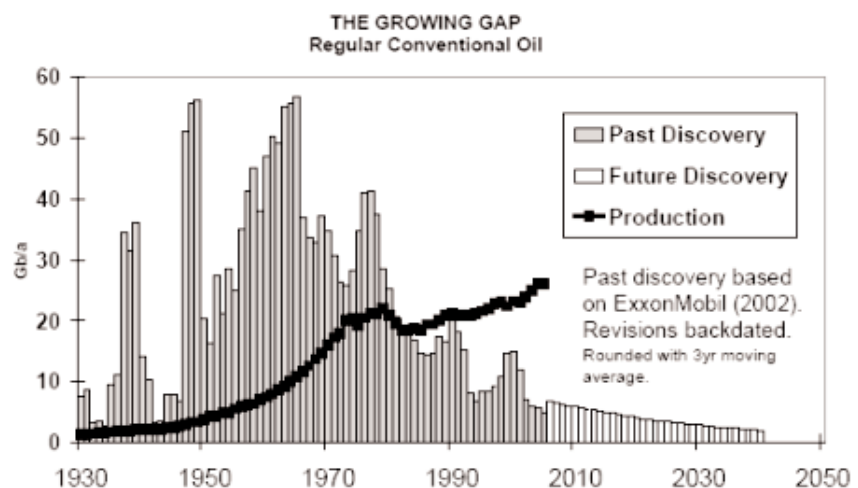


Figure 1: Oil discoveries and production

Source: Association for the Study of Peak Oil and Gas (ASPO), July 2006

oil wells will be much more difficult and costly to access, resulting in higher production costs.

A second stimulus for reserve growth comes from technological improvements which allow higher rates of recovery from both existing and new fields. Better extraction techniques are certainly helping to maintain or increase production in some cases, but there are still limits (e.g. 45% as opposed to 20%). Tellingly, despite more than three decades of spectacular technological advancement, production in the lower 48 United States has continued to decline from its early 1970s peak. The same can be said for many other oil producing regions which have passed their production peaks. In many cases, better technology has allowed faster extraction and thereby precipitated earlier peaking.

Optimists are quick to point out that there are vast deposits of tar sands (e.g. Canada), oil shale (e.g. USA) and heavy oil (e.g. Venezuela). However, all of these suffer from several major disadvantages or limitations. First, their net energy returns are much lower than for conventional oil. For instance, extracting oil from tar sands requires huge amounts of natural gas, which itself is becoming scarcer and more costly. Second, these operations are highly destructive to the environment, in terms of water use and pollution, and general land degradation. Third, their exploitation would require huge amounts of costly capital investment. As a result of these factors, ASPO's geologists do not see potential for more than about 4 million barrels per day emanating from these unconventional sources, which will do little to offset conventional oil depletion in the coming years.

Ultimately, enhanced recovery, new discoveries and unconventional sources of oil will at best buy us some time. They may delay the world Hubbert peak, but cannot obviate it.

**HOW CLOSE ARE WE TO THE PEAK?**

The Hubbert curve makes it clear that the important timing is the peak of world production, not when oil reserves are exhausted. (In fact, rising costs will probably preclude the complete exploitation of oil deposits.) Once again, estimates of when the world peak will occur vary widely.

At one end of the scale, a prominent USGS study estimated in a 'mean

scenario' that oil production would peak in 2037. However, questions have already been raised about this study's highly optimistic underlying assumptions of future discoveries and enhanced recovery, and the reliability of existing proved reserve estimates. The USGS's 'simple algorithm' projects that demand will grow at 2 per cent per annum, stimulating matching supply, until 2037 when a depletion rate of 10 per cent will kick in. If this were to happen, it would be like falling off an oil cliff with dramatic consequences. But given the economics of oil demand and supply, this trajectory seems hardly plausible. In any event, in more recent work the USGS has acknowledged that its previous forecasts were over-optimistic, and that actual discoveries since 2000 have been far lower than their earlier projections.

Estimates of the peak date based explicitly on the Hubbert methodology vary from 2005 to 2016 for regular oil. ASPO's most recent model projects that conventional oil reached its peak in 2005, and all liquids (including unconventional sources) may peak in 2010. Matthew Simmons suggests that Saudi Arabia – the country traditionally relied upon by the rest of the world for spare capacity – may soon reach its production peak, signalling a world peak.

Which view is more credible? On the one hand, the pessimists are mostly independent petroleum geologists and energy consultants such as Campbell and Simmons. On the other hand, the optimistic viewpoints emanate

mainly from agencies such as the USGS and IEA, which are beholden to political regimes, and some oil companies (e.g. Exxon-Mobil and BP) with obvious vested interests (such as avoiding windfall taxes and maintaining indirect subsidies). Interestingly, ChevronTexaco has recently launched a major advertising campaign warning that the age of cheap oil has ended and that we need to find alternatives.

Perhaps actions speak louder than words. The activities of giant oil companies over the past few years have been consistent with expectations of declining – not rising – future supplies of oil. In the first place, they have generally not been investing in additional refining capacity. Secondly, the past few years have seen a spate of mergers and acquisitions, which often indicates an industry in a phase of consolidation and preparation for decline. In this case it may be the only – or at least most feasible – way to bolster their reserves. Thirdly, many of the largest oil companies have been engaged in massive share buy-backs in the past year or two. This would be financial madness if they expected the oil price and hence profits to drop in the future, but is perfectly consistent with an expectation of dwindling supplies and rising prices going forward.

Ultimately, we will only know that oil production has peaked a few years after the fact. This is because the apex of global production is unlikely to be a sharp peak – like many individual country peaks – but rather a 'bumpy plateau'

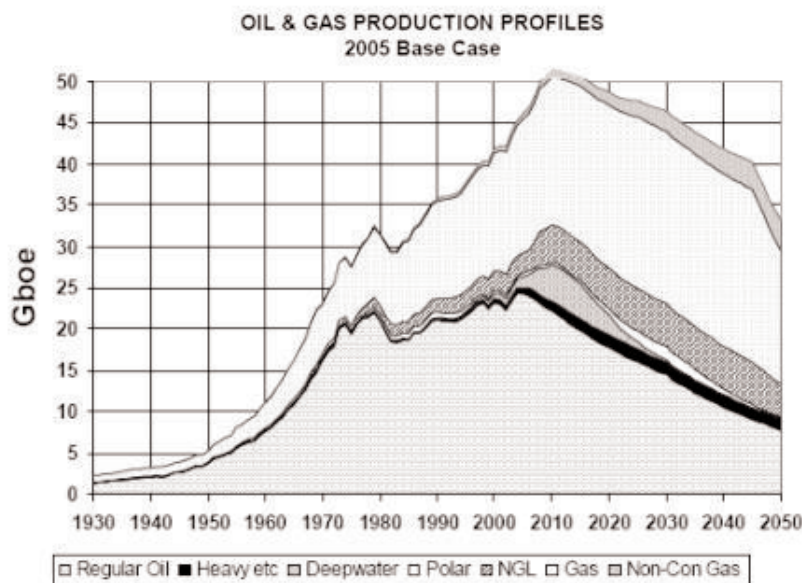


Figure 2: Historical and projected world oil and gas production Source: Association for the Study of Peak Oil & Gas (ASPO), July 2006

as economic and geo-political forces come into play.

### WHITHER THE PRICE OF OIL?

This brings us to the third question posed earlier, namely: what is likely to happen to the price of oil going forward? But let us first consider possible reasons why the price is currently near its all-time high (in both nominal and real terms).

Both Lloyd and Nkomo argue that the lack of worldwide refining capacity is a major reason for the current high oil price. There are at least two reasons to doubt this. First, a lack of refining capacity in the face of plentiful crude oil supplies would surely drive a wedge between the price of crude and refined products, not push up the crude price itself. But that is not what we have been observing. Second, if oil was cheap (as it was in the 1990s), much profit could be reaped from refining large quantities of it. So why has investment in additional refining capacity been so meagre in recent decades, especially in the US?

Certainly rising demand from emerging economies, especially China and India, has played a strong role in the price trend. So too have geopolitical tensions and related short-term supply disruptions – not least of all the conflict in Iraq and in the Middle East more generally. But many of these tensions can be related to underlying competition for future oil supplies. If ASPO and others are correct, then regular oil production has already peaked, which would help to explain why the price has risen so dramatically of late.

We have already had copious evidence of the sensitivity of the oil market to modest supply disruptions, which reflects the highly inelastic nature of oil demand. For example, the effects of Hurricane Katrina and Iraq's 1990 invasion of Kuwait on the oil price were dramatic, if transient. The oil shocks of the 1970s, which saw prices doubling or trebling, resulted from relatively small percentage cuts in world production (e.g. about 5% in 1979). Once global production enters terminal decline, production may – by conservative estimates – contract by 3% per annum.

Thus on the down-slope of the Hubbert curve the world faces an endless sequence of supply-side oil shocks which in all likelihood will cause the oil price to rise rapidly. However, the price will also likely become highly volatile as a spiking price will induce conservation

measures and varying degrees of economic contraction. In the end, the crucial timing may not be the actual date of the oil peak, but rather when a critical mass of investors wakes up to the inevitability of the peak. This realisation could spark wide-spread panic and a sky-rocketing oil price, which would have severe economic consequences.

### CONCLUDING REMARK

There is undoubtedly a future for oil. As we have seen, the important questions are rather: when will global oil production peak, when will enough people become aware of it, and what will be the consequences? The sooner we seriously address these questions and plan for a future with less – and more expensive – oil, the better. Let the debate continue.

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## Audit of women in the energy sector – 10 years on

In 1995, Wrenelle Ruiters, of the then EDRC, published a study, *Affirmative Action in the Energy Sector*, which examined the number of men and women, white and black people in the nuclear, electricity, petroleum and coal sectors. She found, not unexpectedly, that white men held about 96% of the decision making positions, and that prior to 1994, there were very few black men or women employed as professionals at all.

Ten years later, a five-women re-search collective, Khamarunga Banda, Nthabiseng Mohlakoana, Tieho Makhabane, Jacqueline Williams and led by Wendy Annecke, reviewed the position of women in the sector for the Department of Science and Technology.

It was a challenging project: how does one define a woman in the energy sector? Should we include those women who sell paraffin from spazas? What about the women who support women such as the Human Resources personnel at Eskom? And the women who service the energy sector by driving trucks and delivering petroleum, where do they fit in?

It was clear that the energy sector has, in many ways, and with the help of legislation and Charters, opened up employment opportunities for many women, and these were documented. There have also been proactive attempts to increase the number of women professionals. These have met with uneven success, with the proportion of women in engineering faculties increasing only marginally, and there are areas, such as municipal electricity departments, that are still struggling to attract women to top positions. The report deals with avenues through which women enter the sector, the numbers of, and positions held by professional women, women energy entrepreneurs, and energy micro-enterprises. The results of the report will be published soon and will be of particular interest to those involved in education and training for the sector.

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## What's good for business and the environment?

The business case for demand side management (DSM) of electricity is truly triple-bottom line driven, with each of the three legs – financial, environment and social effects – playing an equally important part. The financial benefits to businesses and households of consuming less electricity, or for business of shifting electricity consumption to lower tariff periods, are largely self-evident.

The savings of ordinary households cannot be expected to be of the same magnitude as those of business, but they are still significant. It is estimated, for instance, that an average family of four can save R3000 a year through improved hot-water management – that is, by insulating geysers and turning their temperature down, and by taking showers instead of baths. Taking a more inclusive view, during the financial year 2005-6, electricity savings projects to the value of 239 MW were approved, and of this figure an audited 154 MW in savings were achieved within 11 months as a result of the demand side management programme and energy efficiency drives. This saving equates to a massive R1.5 billion.

The cost saving not only benefits the electricity consumers directly but reduces costs on the supply side. By reducing peak demand usage, Eskom can prevent running additional generating units at its power stations; and by filling in the deep valleys between the peak demand periods through load shifting, the power station can be operated more effectively at more constant output levels. In both instances input costs are reduced. The generation of electricity in South Africa is largely coal based and requires water - and South Africa's need to conserve water resources is well known. The 4800 MW Matimba B power station (code name Alpha) is proposed to use a dry-cooling system, this technology is less water intensive than power stations utilising conventional wet cooling systems e.g. 4110 MW Majuba power station. Dry-cooled systems propose to utilise less than 0.2 litres of water per unit sent out (l/kwh) in comparison to wet cooled

systems, which utilise approximately 1.5 l/kwh of water. Although the dry-cooled system looks better at water usage, it comes with a compromise of about 8-10% of thermal efficiency, making this a more expensive option.

By implementing relatively simple efficiency measures – such as geyser insulation and temperature control, lighting efficiency and pool pump control – ordinary households can achieve dramatic results. At least a 40% saving on the total energy consumed, with more than 27 litres of water, 11 kg of coal, and 20 kg of carbon dioxide emissions saved every day. That is more than 9 940 litres of water and 4 180 kg of CO<sub>2</sub> in just one year – in just one home.

Eskom's demand side management programme aims to save 425 MW of electricity over 20 years. This programme has a social benefit to the economy in the form of energy services companies (ESCOs). Realising that demand side management can succeed only if it is fully market driven, and understanding that setting up and maintaining the systems needed to achieve this was not its core business, Eskom embarked in 2003 on a programme to support the development of these companies that can create and implement demand side management solutions.

The ESCOs assist businesses by conducting audits to quantify opportunities for energy savings and act as intermediaries to negotiate the level of Eskom support for a project, based on its potential. Once a project had been approved by Eskom, the ESCOs implement and provide maintenance services. The development initiatives have yielded an established scorecard, evaluation criteria, and a national association for ESCOs. A number of skills development programmes have also been initiated. Eskom maintains a database of registered ESCOs with 120 companies, of which 38 are black empowered and 12 are owned by women. It is estimated that about 500 direct and 4 200 indirect jobs opportunities have been created by the DSM programme.

*(Article adapted from Sense 39 – Sustainable Energy News, 1 August 2006)*

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## Feedback on ERC Energy and Climate Change Course

The Energy Research Centre (ERC), University of Cape Town, recently held a successful Energy and Climate Change short course from 28 August – 1 September 2006. The course was targeted at executives and policy-makers in South Africa and aimed at equipping them with current and relevant knowledge on Energy and Climate Change.

The course drew applicants from the Department of Science and Technology, the Department of Environmental Affairs and Tourism, Eskom and the City of Cape Town. In addition, our registered Masters students attended the course as part of their course module on Energy and Climate Change.

The course lectures and seminars covered areas such as the science of climate change, adaptation to climate change in Africa, greenhouse gas emissions, mitigation of climate change, technology transfer and climate change, the Clean Development Mechanism and future climate change commitments. Delegates were provided with materials to better equip them for the aspects of their jobs related to energy and climate change, and in addition, were given a platform for networking with others in the field.

The Energy Research Centre hopes to host more short courses in the near future. You are advised to check our website [www.erc.uct.ac.za/courses](http://www.erc.uct.ac.za/courses) from time to time for updates on our future activities.

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## Energy activities at Earthlife Africa

The Energy Policy Unit (EPU) of the Sustainable Energy and Climate Change Project (SECCP) of Earthlife Africa Johannesburg has been involved with stakeholder and energy meetings, energy planning participation and a demand side management working group. Let's see what's come out of these meetings.

### ENERGY POLICY UNIT NATIONAL STAKEHOLDER MEETING

The Energy Policy Unit held a half-day National Stakeholder Meeting on the 21 July 2006 at the Booyens Hotel, Johannesburg. Hassen Lorgat of SANGOCO featured as a guest speaker, locating energy issues within broader struggles for social and economic justice and against poverty and inequality, as well as participating in the discussion. The meeting reflected growing consensus that current policy, in practice if not on paper, is not responsive to people's needs and is unduly focused on global economic competitiveness for the minerals-industrial complex.

One point of reference was the discussion document, first released in February, *Sustainable Energy? - Towards a Civil Society Review of SA Energy Policy and Implementation*. Participants also discussed the upcoming review or revision of the Energy Policy White Paper, which has been mooted by government, noting the need to prioritise amongst the various objectives if policy is to give clear direction to decision-makers and support realisation of public benefits through the energy sector.

The EPU is requesting comment on the discussion document as input to a further publication. A one-page questionnaire has been developed for those only able to make brief comments, as well as a 12-page summary of the discussion document.

### ENERGY CAUCUS MEETING

The above meeting was followed by a meeting of the civil society Energy

Caucus, which considered both renewable energy and fossil fuel developments. The meeting resolved to participate in developing a position paper on biofuels in time for this to be used as input to the national strategy that government has announced is under development. The caucus welcomed the inclusion in the recently passed National Electricity Act of provisions that would allow for a feed-in tariff or similar arrangement to provide appropriate pricing for renewable energy. We look forward to publication of the Renewable Energy Strategy soon.

Participants voiced concern about the proliferation of proposals for new coal-fired power stations (3 EIAs in process in South Africa and 1 in Botswana, near our border), as well as Alec Erwin's pronouncement that South Africa would be building a new conventional nuclear power plant, which seems to make a mockery of the feasibility study that Eskom hopes to have finished by the end of the year. Discussion of affordable access issues suggested that while there has been progress in providing 50 kWh free electricity per household per month through municipalities, only a minority of Eskom customers are receiving this allocated. The low-smoke fuel programme appears to have been abandoned (as implied in the national report to CSD 14).

The Caucus supported development of a proposal to raise funds for establishing a secretariat, to be based with Earthlife Africa Cape Town. Reports back from CSD 14 and the Civil G8 meeting in Moscow did not present any great surprises, though they were far from encouraging. A distinct meeting was planned to address the issue of 'Waste to Energy' projects in the cement industry, to be convened by groundWork on 24 August.

### PARTICIPATION IN INTEGRATED ENERGY PLANNING (IEP II)

Richard Worthington has been repre-

senting Sangoco on the Advisory and Review Committee (the IEPARC), which met for the third time on 25 July. A representative of the National Energy Regulator of South Africa (NERSA) reported on progress with their third National Integrated Resource Plan for the Electricity Supply Industry, which started ahead of IEP II and involves projections of future demand that should be compatible with IEP assumptions. The issue of integrating various planning processes for the energy sector remains unresolved. It was suggested that as the National Energy Bill amendments still appear to be in progress, this could provide a means for clarifying which should be the primary process, or how primary assumptions are decided.

There was considerable frustration amongst stakeholders regarding slow progress, a lack of clarity on process and how stakeholder input, particularly through the four working groups, would be applied or integrated. The roles and aspirations of the committee and working groups have been agreed, but how these will be fulfilled is not clear. A decision was made at the first ARC meeting (4 May) that a project manager be appointed to assist with running the IEP II process, but this now appears to be inhibiting progress as it is not clear how long it will take to secure such services.

Work continues on detailing the four scenarios that will eventually be modelled by the DME team in conjunction with the Energy Research Centre, UCT. It is not clear when we are likely to see details of the differences anticipated under alternative futures, such as fossil fuel and renewable energy technology costs under high or low levels of integration in the global economy and/or under effective international action to avert catastrophic climate change.

The Externalities Working Group (EWG) had its first meeting on 18 July, at which roles were refined and recommendations made regarding the contracting of consultants to undertake the

proposed 6-month desk-top study to quantify externalised costs. The Terms of Reference had already been finalized, so there is no guarantee that concerns regarding due consideration of social aspects, including potential benefits (or opportunity costs of business as usual), will be addressed in the study. The group requested a list of all the existing materials being considered by the IEP team, so that members could draw attention to any relevant studies not yet included. Anybody interested in contributing to this list can contact Richard Worthington (contact details below).

The Integration Working Group (IWG) had its first meeting on 19 July, at which roles and aspirations were agreed and recommendations made to ARC, including that other working groups report ahead of the IWG meetings and have at least one member participating in this group. The proposal for summary reports by the working group chairs was subsequently supported in the ARC and most groups have motivated for allocation of resources to support their work. The issue of integrating various planning processes for the energy sector, as well as related planning or projections being undertaken to inform policy development (e.g. the Long Term [climate change] Mitigation Scenarios process mandated by cabinet and getting started under DEAT), is no longer a significant focus for the IWG.

#### FEEDBACK ON THE IEP II DEMAND SIDE MANAGEMENT WORKING GROUP

This was the second meeting of the demand side management-working group. The key objective of this meeting was to analyse gaps in data collection presented through a template based on the modelling requirements. The meeting established that the template / data set presented suffered from the historical challenges of IEP I data set where demand data for 'energy intensive' industry focussed on for example gold mining (mining sector) and exclude other mining subdivisions like Iron Ore mining as an 'energy intensive' subdivision of the mining sector. The cement industry needs to be included as an 'energy intensive' industry on its own, instead of its demand projected under the category of example 'other industry'. It was recommended that the IEP II process must acknowledge that some sectors have

grow and become more energy intensive in recent years and specific data must be collected to determine their demand.

It was recommended that the demand data by fuel type, for example of industry, commercial and residential sectors, should also include renewable energy (not only biomass, but also solar). We also established that the Department of Minerals and Energy, through its energy efficiency division, will be developing a database, which will be supplemented by a manual, for collecting data on energy efficiency under the theme of monitoring the implementation of the Energy Efficiency Strategy. The data obtained in this process will be made available as input to the modelling.

The Energy Research Centre, com-

mitted to develop the model, is going to populate the framework /template with data, which will be presented for interrogation at the next meeting.

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## WEC members meet in South Africa

The World Energy Council (WEC) South Africa Member Committee, SANEA, hosted the second WEC Africa Regional and Scenarios Study meetings in Johannesburg from 5 - 7 July. Representatives from eight African Committees attended the meetings. The regional meeting focused on the WEC Africa Regional Action Plan, progress to date and the main events planned for the rest of 2006 and 2007. These include a Regional Forum on Energy Efficiency; a PGP Workshop in Namibia and an International Conference on the INGA hydropower project. The WEC Egyptian Committee made an impressive presentation on 'The Egyptian Experience with Wind Energy'.

The regional meeting was followed by a workshop on WEC's Scenarios Study. The four storylines for Africa were developed and the related tables completed for the non-mitigated cases. The impacts of mitigated policies for achieving the three WEC goals of Accessibility, Availability and Acceptability will be completed shortly; these will identify and propose proactive and appropriate policies on a sub-regional and regional basis. It became obvious during the workshop that the preliminary analysis carried out for four sub-regions out of five is critical to the success and value of the global study.

On 7 July, a technical visit was organised to SASOL, an integrated South African oil and gas company with substantial chemical interests. SASOL specialises in coal-to-liquids and gas-to-liquids operations and currently supplies about 40% of South Africa's fuel consumption by mining coal and converting it into synthetic fuels.

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**World Energy Council**  
CONSEIL MONDIAL DE L'ENERGIE

# Energy efficient cooking training and demonstrations

## WHY ARE THERE DEMONSTRATIONS?

Everybody cooks and everybody can benefit from using more energy efficient cooking practices. Poor people spend and estimated 25% of their disposable income on energy, of which more than 90% can be spent on cooking. However, with recent electricity supply disruptions, affluent households also realised how important energy efficiency can be and how inconvenient it can be if you are stuck without a back-up plan. So, if you are motivated by monetary savings or convenience or back-up, energy efficient cooking practices are simple, easy and affordable ways to make your contribution to general energy conservation and efficiency.

At Palmer Development Consulting (PDC) we have been involved in household energy issues for a number of years and realised that despite the importance of cooking energy, the shortages experienced by households and the dire consequences of lacking adequate cooking energy, very little official attention is being paid to the subject. Recent electricity supply disruptions in the Cape caused the telephone to ring off the hook with desperate people wanting to know which energy efficient technologies are available. Also, due to PDC's involvement in solar cooking, we receive numerous requests to demonstrate solar cookers at public events such as workshops and conferences. However, we realised that the people interested in using the devices hardly have the opportunity to learn more and be exposed to a product demonstration – and so the "Energy Efficient Cooking Training and Demonstration" events were conceived.

## WHEN AND WHERE?

Demonstrations will be conducted in Pretoria and Cape Town but can be organised anywhere if enough participants can be brought together. This is an ideal event for corporate organisa-

tions wishing to emphasise energy efficiency and looking for ways to benefit their employees. All sessions start at 9:30 am and will finish at 13:30 pm.

- Training courses will take place in Pretoria on the following dates:  
Saturday, 25 November  
Wednesday, 29 November  
December training sessions can be arranged on request.
- The Cape Town sessions are provisionally organized for:  
Friday, 10 November  
Saturday, 11 November  
December training sessions can also be arranged on request.

## WHAT CAN I EXPECT?

Different solar cookers and heat retention cookers will be used to prepare a variety of dishes – people are welcome to request specific dishes to be made. The food prepared will be served for lunch at the end of the training session.

Solar cookers use the light and heat from the sun to cook food while *solar heat retention devices* cannot cook food but use residual heat to complete cooking or to keep food warm between cooking and eating it. The cooking process is started on any conventional stove or solar cooker and after some cooking time, the pot is removed and placed in a heat retention device. The cooking process is finished without using any more energy. Using a retained-heat cooker can save 50-75% on fuel use.

Through presentations and discussions, you will learn more about energy efficiency and how to incorporate the principles of energy efficiency in your everyday life with minimum hassle and great results.

## COST?

The cost of the training is R250 per person. For this, people will receive the training course, course notes, a recipe booklet, a brochure containing notes and tips, a solar cooked lunch (if the weather is not playing along, a lunch

prepared in an efficient manner) as well as a small HotBag (heat retention device).

## HOW TO BOOK?

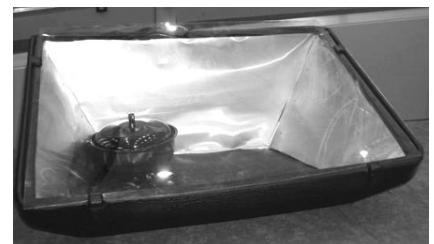
Contact Marlett Balmer – details below.

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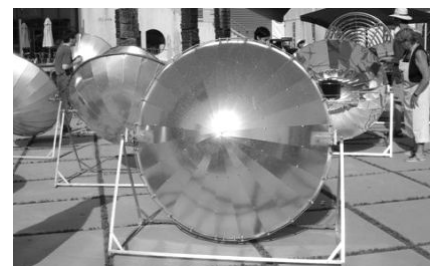
Some of the devices to be demonstrated include:



A HotBag



The Sunstove



The SK parabolic cooker

I attended the Lephalale Conference in Lephalale late August, organised by the Fossil Fuel Foundation (FFF). Some of the developments have made the national press, so I thought you might like some first-hand news.

Claris Dreyer of Kumba opened with a review of the geology. It is extraordinarily consistent, going from the western side of the N-S running Daarby fault 50km to the Botswana border. The only inconsistency is the existence of weathered material in the uppermost zone in many places, which is a pity as the top zone has some of the best coal. The Upper and Middle Ecca series are generally under about 15m of overburden, and the coal is contained in 110m under that, but the overall yield is only 30% - 70% of what they mine is discard. To the east of the Daarby, the coal seams are 400m deep. Iscor is looking at the possibility of mining in this region; and Anglo has developed some coalbed methane.

Piet Nel of Kumba then outlined the further development of the field. It was largely driven by the need for coal to fuel large power stations. Internally they had had to enquire how the electricity price might move. 60% of power station costs were fuel. If they were to develop the mine as they foresaw the demand, then they anticipated a 300% increase in the electricity price driven entirely by the coal costs.

Johan Hager of Kumba gave some insight into the complexities of mine planning with multi-seam and multi-product. To balance everything in the face of changing demands is a real problem, particularly as what you expose must be mined fairly rapidly or it will spontaneously combust.

Leon Roux, also of Kumba, talked about the role of geophysics in providing a reality check for exploration drilling. One of the problems is of lost core. The BX boreholes (110 mm) cost R1m to drill and sample, and some samples go "wrong" because core is lost and the mappers pick up the wrong horizon. Geophysics can give down-the-hole maps to the necessary 5 mm depth precision.

Johan Dempers of Eskom gave a perspective on future power generation that I had not heard previously. There was only one more package of coal in the Witbank area sufficient for a 6-pack. There were two further south in the Secunda area, and one further east around Belfast. There were two in the South Vaal region of the Free State and



## Fossil Fuel Foundation Lephalale Conference

perhaps one further west near Welkom. However, in the Waterberg he estimated there was sufficient for at least 8 six-packs in addition to Matimba B and B2. This was more than in the whole of the rest of South Africa put together. He was very scathing about plans to require Eskom to increase its renewables - there is a suggestion that they should install 10% of future capacity as renewables. He felt those making such proposals lacked understanding of what an additional 1200 MW annually meant. He doubted if the total wind power could exceed 600 MW; there was little hydro left; wave power was still a dream. He was also scathing about DME's licensing - over 8000 applications annually were gaining <200 successes, and much coal on which they had been relying fell under old-order mining rights that should have been automatically renewed and instead were being refused outright, and would have now to go through the appeal process.

Steve Bodon spoke on the geohydrology of coal-bed methane. They had to understand the flow of underground water for about 10 km round their test site. The test site was a standard 5-hole test set-up, and had been producing since June 2004. Production

peaked around March 2005, and had been on a slow downtrend since then. They were keeping going, as every month improved the models they were using for reserve estimate. The total reserve was at least 1tcf. Preliminary hydrofracking had been necessary, but the frac zones were at least 450 m radius from the central hole.

I then spoke on the use of the Bergius process to liquefy the Upper Ecca coal. It is some of the most liquefiable coal in the world. Just add ~6t H<sub>2</sub> /100t coal and you land up with a high-octane gasoline from which you can extract useful things like ethylbenzene (the basis for styrene) and p-xylene (the basis for PET and Terylene) both of which are undersupplied in South Africa because the feedstocks are not available. The demand is for about 200kt styrene and 150kt PET, both of which would require world-scale plants.

Johan de Korte of the CSIR talked about the briquetting of Waterberg fines. Provided you dried the coal to <10% total moisture, the Upper Ecca (high vitrinite) coals could be readily briquetted without a binder.

Deidre Strijdom of Transnet spoke on the development of the rail system serving the region. The biggest prospect was for an extension of the RBCT line to keep RBCT in service as the Witbank supply waned. However, there was also a strong possibility of a link to the Saldanha line. Moreover, a Sishen-Coega link was far along its planning. She noted with interest the Trans-Kalagadi line to a new deep-water port north of Port Nolloth, which was receiving considerable international attention.

Beyers Havenga of the Department of Water Affairs spoke on the enlargement of the Mogol dam and other schemes to enhance the supply to the area.

Andre Coetzee of the Lephalale Development Forum spoke about the socio-economic impacts. They expected to grow from 20 000 to over 60 000 within three years as Matimba B and mine extensions occurred. Ellisras used to be a sleepy town - it is now clearly booming, with a big new Pick'n Pay, a Woolworths and even a Starbucks. Pam Golding Properties had a few properties for sale at <R1m, but most were well above this.

Martiens Prinsloo of Groundwater Consulting spoke about the impact of coal mining on groundwater. He was rather pessimistic on acid mine

drainage, but in discussion it transpired that, while he had correctly identified sulphide mineral oxidation as the source of the problem, he had neglected to address the impact of oxygen transport on the rate of oxidation. In many cases there would be no AMD once initial flushing had taken place.

Dr Stefan Adamski of Kumba then spoke on backfilling the mine. The problem was that 70% of the waste was reactive and liable to spontaneous combustion, even though it had a cv below 6MJ/kg. Careful modelling had shown that thin layers, and the use of a low-permeability cover, prevented heating from getting out of control. The mine has so far successfully backfilled nearly 1bn tons using his findings.

The Conference closed with Johan Beukes, Manager, Coaltech 2020, outlining how the programme supported the further development of the mine.

I was able to tour the mine. It is 1.5km wide, 3.5km long E-W, and about 130 m deep on average. From the viewpoint the 240 t trucks look like toys - then they come near, and you can see why every lesser vehicle carries a red flag on a long pole, to warn the truck driver of its existence! There are six washing plants each dedicated to the coal from one or two of the mining benches. Control of trucks is via GPS and a central computer model.

The proceedings were to be made available, shortly after the Conference.

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## UNDP National Communications Support Program Workshop held in Pretoria

The UNDP National Communications Support Program (NCSP) is to assist Southern African countries in their preparations of the Second National Communications (SNCs), specifically on GHG inventory and mitigation analysis issues.

The UNFCCC/UNDP/UNEP workshop, hosted by South Africa in Pretoria, facilitated discussions on the mitigation analysis process for the SNC. The workshop participants were national climate change studies coordinators from 35 African countries, both Anglophone and Francophone (Non Annex I, NAI, African countries). This provided the opportunity to meet the national climate change study coordinators and increase network contacts. The workshop was held at Silver Lake, Pretoria, from 13-15 August.

Key conclusions from the mitigation sessions were as follows:

- Mitigation analysis is more than submitting a report on a number of generic mitigation options, and that a detailed mitigation analysis will involve mitigation assessment of the options;
- A significant number of NAI Parties were able to incorporate mitigation assessment in the mitigation analysis for the INC;
- Mitigation analysis has to be harmonized with GHG inventory and V&A assessment methodologies;
- Mitigation analysis requires involvement of key stakeholders in order to link mitigation to national development;
- Mitigation analysis has to be done in a practical manner in order to generate interest of decision/policy makers;
- Identification of relevant experts and collection of key data is crucial for proper mitigation assessment;
- A continuous process for mitigation analysis should be considered rather than making it a once off exercise for COP reporting. This can enhance human and institutional capacity building; and
- Parties can seek for external assistance through the NCSP for specific issues on mitigation analysis. Costs of external expertise involvement will be between the NCSP and the Party, the latter drawing from funds from the national climate change project.

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## Energy regulator issues first gas licence to Sasol Gas for construction of distribution pipelines

The new Energy Regulator has issued its first licence since it started operations, well within the statutory limit of 60 days.

The process leading to the final issuing of the licence incorporated the new transparent approach to economic regulation and included:

- its publication in newspapers for public objection; and
- a public hearing on 17th August 2006.

The National Energy Regulator of South Africa (NERSA), a regulatory authority established in terms of the National Energy Regulator Act, 2004 (Act No. 40 of 2004) has issued a licence to Sasol Gas Limited, in terms of the Gas Act, 2001 (Act No. 48 of 2001) for the purpose of the construction of gas distribution pipelines in the Roodekop area of Germiston.

While the electricity industry has been regulated since 1995, the piped-gas and petroleum pipeline industries were regulated for the first time in South Africa from 1 November 2005.

The issuing of the licence to Sasol Gas is a milestone decision for the Energy Regulator, as this is the first licence to be issued for the piped-gas industry since the regulator commenced regulation of piped-gas and petroleum pipelines on 1 November 2005.

The Energy Regulator has granted Sasol Gas Limited a licence to:

- construct gas distribution pipelines with an average operating pressure of 6.25 bar gauge and a maximum operating pressure of 7.5 bar gauge in the Roodekop industrial area of Germiston;
- construct a pressure reduction station (PRS) to reduce the operating pressure from 30 bar gauge to

6.25 bar gauge at a specific location.

The construction licence is valid for a period of 18 months, commencing on 1st September 2006 and expiring on 29th February 2008, unless revoked in accordance with the provisions of the Act. Thereafter, it is expected that an operating licence will be issued.

The full licence conditions are available on the NERSA website – details below.

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## Current status of EDI restructuring

### BACKGROUND

On 14 Sep 2005 a Cabinet decision was announced: '6 metro Regional Electricity Distributors (REDs) are to be set up as soon as possible after the local elections. Eskom is to play a critical role in the national RED.'

Subsequently, there was a meeting of economic cluster ministers on 29 Nov 2005 where it was decided that there will be 6 Metro REDs confined (for the 1st phase) to metro boundaries - and this needed to be confirmed by March 2006. The role of the economic cluster ministers is to consider issues and recommend to Cabinet for adoption.

To date, no final confirmation has been received from Cabinet regarding these issues.

### KEY RECENT EVENTS

#### Public hearings

Parliament's Portfolio Committee on Minerals and Energy held public hearings on June 21 - 23, 2006 on the establishment of a National RED. The Portfolio Committee is an all-party group of Members of Parliament (MPs) with interests in Minerals and Energy policy. The Committee solicits opinions from various stakeholders, and then makes a recommendation.

In the Public hearings, various stakeholders expressed their opinions on the issue, namely: SALGA, NERSA, Eskom, some large municipalities, Energy Intensive Users Group (EIUG), RED 1, Organised Labour (COSATU, IMATU, Solidarity) and the Association of Municipal Electricity Undertakings (AMEU). Other written submissions were also forwarded to the committee.

On 24 August 2006 the Parliamentary Portfolio Committee on Minerals & Energy issued a report to Cabinet in which it expressed its opinion based on the Public hearing comments. The Portfolio Committee recommends the 6 REDs Model. Eskom envisages that the Portfolio Committee inputs will be taken into account by Cabinet in taking the final decision.

### Financial modelling reconciliation

Subsequent to the Parliament's Portfolio Committee public hearings, Eskom and EDIH met to review the financial model on the viability of the National RED.

Differences in modelling parameters and approach were converged into one financial modelling exercise. In an effort to move forward, National Treasury, DPE, DME, Eskom and EDIH set the parameters and terms of reference for this initiative. The outcome of this exercise confirms that the National RED is financially viable.

### The way forward

Eskom is continuously engaging with the various stakeholders regarding the final structure of the Industry. In the meantime, it will remain focused on its current business.

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## Parliamentarians told seventh 'national' RED unconstitutional

On the first day of parliamentary hearings, Eskom enthusiastically endorsed the idea of a seventh RED for all municipalities outside the six metropolitan REDs already provided for. According to Eskom, municipalities have an estimated electricity distribution infrastructure refurbishment backlog of about R9.3 billion but most of them were not making the required investments, therefore, the creation of the 'national' RED alongside six metro-based REDs would address the critical lack of investment in electricity distribution. In addition, Eskom could achieve the restructuring quickly without much cost or disruption to staff or customers. It has the skills, resources, and track record of delivery and could play an important role in the rural electrification drive.

To address the concern by municipalities that they would lose assets including revenue, Eskom proposed that it would transfer its businesses within the metropolitan areas to metropolitan REDs, which would function as municipal entities under local government legislation; this would provide the municipalities with additional revenue. Eskom's CEO, Thulani Gcabashe, cautioned the committee that South Africa could well find, after Eskom's R97 billion capital investment programme, that it had sufficient capacity to generate and transmit electricity but not enough to distribute locally because of lack of investment at this level.

The South African Local Government Association (SALGA) warned the committee to be cautious about Eskom's endorsement given its obvious interest in the seventh RED. SALGA's submission reaffirmed that no municipalities are interested in joining with Eskom in a 'national' RED for rural areas, and to compel them to do so would be unconstitutional. Electricity reticulation is a municipal function in terms of the constitution, and for many municipalities revenue earned from electricity sales is critical as surplus is used to cross-subsidise other, loss making municipal services.

SALGA, the National Energy Regulator of South Africa (NERSA), the Association of Municipal Electricity Undertakings (AMEU), and Cape Town RED1 strongly supported and recommended that the blueprint of six wall-to-wall REDs be adhered to, and that key customers should be transferred to the REDs along with Eskom's assets. Cabinet should create an environment where incentives are provided to the relevant municipalities to merge with an appropriate metro RED, ultimately leading to the six wall-to-wall REDs. Saleem Mowser, CEO of RED1, pointed out that a national RED would compromise some 187 municipalities making consensus in policy formulation difficult.

The Congress of South African Trade Unions (COSATU) said it was opposed to the creation of standalone, metro-based REDs, because this model would lead to the privatisation of the entities. It called for an immediate halt of the piecemeal restructuring until thorough engagement on the details of the phases and the end vision takes place. COSATU believes the proposed model would prevent geographic cross subsidisation and reinforce disparities between urban and rural areas.

Parliamentarians also heard that the results of an electricity distribution modelling exercise showed that the 'national' RED option was not financially viable – 'cash negative' – and would operate at a loss without external financial support for an unspecified period. This would have a negative impact on the economic growth of the areas served by the national RED and a broader negative impact on the cost of doing business in South Africa. This is despite Eskom's claim that the 'national' RED would be financially viable, with projected revenue of R187 billion, a gross profit of R12.6 billion, and net income before tax of about R1.6 billion.

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## Limpopo coal-fired power station air quality standards not met

While media reports claim that a record of decision on the proposed Matimba B plant is imminent, relevant air quality standards have yet to be promulgated under the National Environment Management: Air Quality Act (2004) and a decision based on the submitted Environmental Impact Assessment Report (EIR) may set dangerous precedent.

Eskom has been saying that its new coal-fired power station(s) would have dry cooling but no Flue Gas Desulphurisation (FDG). The Environmental Impact Assessment Report (EIR) for *The Proposed Establishment Of A New Coal-Fired Power Station In The Lephalale Area, Limpopo Province*, produced by Bohlweki Environmental (Pty) Ltd (May 2006) - clearly indicates that this will not be acceptable. Development of a new power station close to the existing Matimba station may require fitting sulphur control equipment to the existing plant, since even FDG at 90% efficacy at a new plant (at the proposed final capacity of 4 800 MW) would significantly increase incidents exceeding existing ambient air quality standards.

The EIR notes that non-compliance with ambient air quality standards already occurs as a result of Matimba power station emissions. 'Sulphur dioxide concentrations have been measured to infrequently exceed short-term air quality limits at several of the monitoring stations, with infrequent exceedance of such limits modelled to occur at the nearby residential areas of Marapong and Onverwacht.' (p.273). It appears from the report that this actually occurs on a routine basis.

The Report notes 'The health threshold given as being associated with mild respiratory effects (660 µg/m<sup>3</sup> as an hourly threshold for SO<sub>2</sub>) was measured to be exceeded at [three] monitoring sites. This threshold was predicted to be exceeded a maximum 3 to 4 hours at Marapong.' It is not stated

whether this is per day or per annum. This concentration is significantly higher than allowed by current and proposed new standards, not only the 1-hour maximum of 350µg/m<sup>3</sup>, but even the 10-minute maximum of 500 µg/m<sup>3</sup>.

While Matimba is identified as the main contributing source, other significant sources include 'spontaneous combustion of coal discards associated with Grootgeluk mining operations and potentially household fuel burning with-in Marapong' (p.273). There is no monitoring station located in Marapong. The report notes that the community is not downwind of the power plant and that domestic coal use would add to emissions from Matimba.

The approach of Eskom in seeking a Record of Decision for the Matimba B plant, on the basis of the EIR submitted, seeks to place a burden of further enquiry on DEAT officials. It may also be intended to influence decisions regarding the proposed ambient air quality standards published for comment in June. The EIR does not propose or recommend specific pollution mitigation technology for the new plant. The Air Quality section concludes: 'It is recommended that the impacts associated with likely control operations be quantitatively assessed.' - surely something that should form part of the EIA itself and be detailed in the final report.

The EIR concludes that 'Compliance with ambient air quality standards given for sulphur dioxide cannot be achieved due to the implementation of SO<sub>2</sub> abatement measures for the proposed power station given that non-compliance already occurs due to existing operations.' This may explain why consultants were initially reluctant to release the report to Earthlife Africa Johannesburg, noting its submission to DEAT. It is not clear whether copies have been provided to other interested parties.

Conclusions in the report include:

- 'The need for and required control efficiency of abatement measures was assessed on the basis of avoiding any significant increment in non-compliance or health risks.'
- 'Even given 90% control efficiencies on all six units, the maximum predicted hourly concentrations, the spatial extent of non-compliance with the 10-minute limit and the frequencies of exceedance at Marapong would still be marginally higher than for current operations.'
- No quantification is provided of

what is considered significant or marginal.

The sections dealing with water quality and soils and agricultural potential do not recognize, much less address cumulative acidification impacts from air-borne emissions and there is no attempt to compare the long-term benefits of sulphur capture (which include reduced mercury emissions) with the operational penalties, such as increased water use, visual impact and resource use.

Richard Worthington, Co-ordinator of Earthlife Africa Johannesburg's Sustainable Energy and Climate Change Project, comments: 'The political climate seems favourable to Eskom pushing for a hasty decision. Hopefully the DEAT will be mindful of constitutional rights and get expert legal advice regarding the potential impact of any precedent that may be set. There is no question of a new coal-fired power station in this area not gaining eventual approval and a similar dynamic probably applies to the coal-fired plant proposed just over the border in Botswana.

'Key questions include:

- whether a record of decision should be issued without the project proponent specifying what pollution mitigation equipment is proposed and/or undertaking further studies, including the assessment of 'impacts associated with likely control operations' called for in the report and cumulative acidification impacts;
- whether approval should be allowed to precede promulgation of air quality standards - including limiting the number of exceedances of standards will be considered acceptable;
- whether a decision could include a requirement that the existing Matimba plant be retro-fitted with desulphurisation equipment;
- how long local communities will have to wait before the ambient air quality they live with is subject to measurement.'

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# A study of energy in a rural community

A paper that I co-authored with Alastair Dick and Mark Howells titled: *The energy profile of a rural community (Journal of Energy in Southern Africa, Volume 15 No. 3 – August 2004)* has attracted quite a lot of interest. Many people have asked for the underlying database, and have been surprised at the range and depth of the information. How, they want to know, did you get all that? It is the purpose of this article to outline some of the steps we took to get lots of good, consistent data.

The first thing was to have a fully tested questionnaire. I had developed a questionnaire for an earlier study, and we had identified a number of problems with it, which were resolved before we went any further. Then the draft questionnaire went through several rounds of testing and incorporation of more questions before we were convinced that it was robust, gave unambiguous answers and was easily understood. That took time, but it was well worth the effort, because validation of the results was immensely simplified.

Then we translated the questionnaire into Zulu and added lots of pictograms to aid comprehension. Making certain that the translation did not destroy the robustness meant another round of testing, and some modification of the translation to resolve ambiguities. Finally, the questionnaire was ready.

It was time to train those who were to administer the questionnaire. We chose learners from the senior school in Nkweletshini who were in Grade 8. It made sense to use local children. Firstly, our project dovetailed nicely with a project they were undertaking as part of their syllabus. Secondly, there were enough learners to spread the load quite widely - each had only 12 questionnaires to administer. Thirdly, they wanted soccer balls for practice, even more than they wanted pocket money. Finally, they were known within their community, so it was comparatively easy for them to win the confidence of

those whom they were interviewing. So we had a cohort of administrators who were willing, able, and highly cost-effective!

Once they had been trained, they had to test their understanding on their own families. Very few problems emerged from this final test. Then they were off to do their interviews.

The results were very 'clean'. We had been concerned that there would be a lot of debriefing, but as we started to assess the first returns it soon became clear that all the preparation had been worth while. The responses, even on complex questions such as household income and weekly purchases, were consistent and comprehensible. In all, some 100 households answered 85 questions clearly; interviews did not take long; and the learners completed their project with plenty of time left to enjoy their new soccer balls!

Most of the energy aspects have been covered in our baseline paper. There were a number of surprises, such as the number of households who possessed an LP gas cylinder, which cost them as much as R15/kg to fill. Why, we wanted to know, did they have this additional fuel when they relied on free firewood for most of their needs. The answer was simple - when there was a social gathering, you didn't want people to know you still used wood!

From such simple demonstrations of human needs, we can learn how, rural poor or urban rich, in the end, we are all the same!

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## NERSA findings on Western Cape power outages

The National Energy Regulator of South Africa (NERSA) at its meeting of 28 July 2006 approved the release of the findings and recommendations of the task team that was commissioned to investigate the root cause (s) of the events that led to power outages in the Western Cape by Eskom on the following incidents:

- 11<sup>th</sup> November 2005 (Koeberg 400 kV busbar event)
- 12<sup>th</sup> November 2005 (Beta-Hydra line & Koeberg Power Station)
- 16<sup>th</sup> November 2005 (Droerivier-Muldersvlei line and Koeberg Power Station)
- 23<sup>rd</sup> -26<sup>th</sup> November 2005 at Koeberg Power Station
- 18<sup>th</sup> -19<sup>th</sup> February 2006 (Koeberg Unit 2 event)
- 28 February 2006 (Bacchus-Droerivier line event)

The Western Cape outages were undertaken in terms of Section 4 of the Electricity Act of 1987 (Act No. 41 of 1987). Section 4 (4) provides that the Regulator may advise the Minister on any matter relating to the electricity supply industry and 'it may for this purpose carry out such investigations as it or the Minister deems necessary.'

The National Electricity Regulator which was responsible for regulating electricity in the country was officially discontinued on the 17 July 2006, its functions and decision were taken over by the National Energy Regulator of South Africa (NERSA) that is now regulating electricity, piped-gas and petroleum pipelines. Before the functions of the NER were taken over by NERSA, it had commissioned an investigation into the power outages that took place in the Western Cape as from 11 November 2005 to 28 February 2006.

The Task Team was mandated to establish the root cause(s) of these events and whether:

- licence conditions were breached
- there was negligence in the actions



or omissions leading up to these events

- the maintenance was adequate for the security of supply
- the appropriate remedial/ corrective action was taken; and
- the future plans (long or short term) are adequate

NERSA engaged with Eskom at an executive and technical level to understand the root cause(s) of these interruptions and whether this was symptomatic of future events that can be expected. It also requested Eskom to provide short term and long term plans to ensure that interruptions were eliminated. In short, NERSA did not want any recurrence of the outages that the Western Cape had experienced.

The Task Team that NERSA commissioned to investigate the root cause (s) of the events that led to power outages in the Western Cape had to investigate the following incidents:

- 11<sup>th</sup> November 2005 (Koeberg 400 kV busbar event)
- 12<sup>th</sup> November 2005 (Beta-Hydra line & Koeberg Power Station)
- 16<sup>th</sup> November 2005 (Droerivier-Muldersvlei line and Koeberg Power Station)
- 23<sup>rd</sup> -26<sup>th</sup> November 2005 at Koeberg Power Station
- 18<sup>th</sup> -19<sup>th</sup> February 2006 (Koeberg Unit 2 event)
- 28 February 2006 (Bacchus-Droerivier line event)

The report does not cover the incident that occurred at Koeberg Power Station on the 25<sup>th</sup> December 2005 since there was already another state

agency investigating the matter.

NERSA consulted with all relevant stakeholders during the investigation including briefing relevant Ministries.

Eskom was given an opportunity to respond to the findings of the Task Team before the recommendations of the said Task Team were adopted by the Energy Regulator.

### FINDINGS OF THE TASK TEAM

- On the incident of 11 November 2005 at Koeberg Power station and Substation, the investigation established that there was negligence on the part of the responsible people, the maintenance procedures were not adequate and the licence conditions stipulated in the Grid Code were breached.
- On the incident of 12 November 2005 on the Beta-Hydra line and Koeberg Power station, the investigation found that commissioning and/or maintenance procedures were inadequate and that the protection system operated incorrectly.
- On the incident of 16 November 2005 on the Droerivier-Muldersvlei line and Koeberg Power station, the investigation found that the licence conditions were breached and the implementation of remedial and/or corrective actions were not adequate.
- On the incident that occurred from the 23<sup>rd</sup>- 26<sup>th</sup> November 2005 at Koeberg Power station, the investigation established that there was negligence on the part of the responsible Eskom personnel and that the operating risks assessment process was inadequate.
- On the incidents that started on the 18<sup>th</sup> -19<sup>th</sup> February 2006 at Koeberg Power station, Droerivier, Bacchus and Muldersvlei transmission lines, the investigation found that the maintenance procedures and policies for the substations and transmission lines were inadequate, the

licence conditions were breached and there was negligence on the part of Eskom.

- On the incident of 28 February 2006 at Koeberg Power station and Bacchus-Droerivier line, the investigation established that the corrective actions that were recommended in the recent events were implemented correctly, the coordination of the protection and tele-protection systems is inadequate, the maintenance policies and procedures are not adequate and that there was negligence on the part of Eskom.

The events described above indicate that there were deficiencies in some of the configuration management system, commissioning procedures and maintenances practices or policies. There was also a trend that indicated ill-discipline in certain areas and non conformance to procedures. The co-ordination of the protection system required close monitoring and calculated risks or trade-offs.

#### PUNITIVE AND CORRECTIVE MEASURES

The Energy Regulator has considered various sanctions and corrective actions it can impose on Eskom. These include, but not limited to:

1. Electricity legislation
2. Contravention of the license conditions and the Grid Code
3. Incentive Based Economic Regulation
4. Recovery Plan (monitoring thereof)

It is the view of the Energy Regulator that Eskom transgressed its licensing conditions and was negligent and the following sanctions will be imposed upon Eskom:

- In terms of the Electricity Act of 1987 (Act No. 41 of 1987), the Regulator may lay a criminal charge against Eskom and if found guilty of an offence will be liable on conviction to a fine not exceeding R500 for the first conviction. The Electricity Regulation Act of 2006 (Act No 4 of 2004) which became operational with effect from 1 August 2006 provides that in the event that a licensee is found guilty by Energy Regulator sitting as a Tribunal, the Tribunal may impose a fine of 10% of the annual turnover or 2 million rands per day which ever is the higher. However, since this Act was

operationalized after the incident, Eskom could be liable for a fine of R500 if found guilty by a court of law.

- The Multi Year Price Determination (MYPD) allows the Energy Regulator to clawback certain amounts that were allowed to Eskom with respect to their capital and operational expenditure. The regulator is evaluating those areas where it can apply the clawback mechanism as a punitive and corrective measure, which can be up to about R300 million.
- The MYPD mechanism also allows incentives and penalties relating to the security and continuity of supply. For the first year there is an amount of R10 million which will be used to encourage security of supply and continuity.

Eskom must be commended for developing a detailed and comprehensive Western Cape Recovery Plan which indicated a number of initiatives that involved the key stakeholders in the Western Cape as outlined below:

- Generation Capacity strengthening and an additional 1050 MW for the Western Cape area
- The Western Cape Transmission Corridor strengthening
- The Demand Side Management initiatives
- The Koeberg unit restoration and refuelling plan

It was also encouraging that there was an improvement in the implementation of the corrective actions as demonstrated by the correct islanding of the Koeberg unit during the incident of 28 February 2006.

As predicted in NERSA's assessment of the Western Cape Recovery Plan, the Energy Regular is applauding Eskom for ensuring that all necessary precautions were taken into account to avoid the frequency of power outages during winter.

The National Energy Regulator will always ensure that energy industry is vigorously regulated to bring order and stability.

#### ESKOM'S RESPONSE TO THE REPORT

Eskom has expressed its disappointment at the report. The essence of its statement was that while it fully supports NERSA in their mandate to evaluate Eskom's operational performance in terms of the licence conditions, it does not agree with their interpretation

of the technical facts or with their conclusions.

Eskom accepted that there were certain shortcomings in the Western Cape that were compounded by challenging climatic circumstances. They were unequivocal in expressing their view that this did not amount to a breach of a licence conditions or negligence. Eskom advised that they will resist any attempt by NERSA to impose unjustified penalties or sanctions.

Eskom said that given the extraordinary circumstances in the Western Cape at the time, they are confident that their performance was in line with the operational plans and parameters agreed with the regulator.

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## Power purchase agreement for first IPP Wind Farm signed between City of Cape Town and Darling Wind Farm

Almost three years after the 2nd World Wind Energy Conference (WWEA) was held in Cape Town, the Mayor of the City of Cape Town, Helen Zille, and the CEO of Darling Wind Farm, Hermann Oelsner, recently signed a 20-year contract for the supply of green electricity from the Darling Wind Farm. The Power Purchase Agreement (PPA) was the last remaining milestone required for financial closure of the first Sub-Saharan African IPP wind farm project.

The wind farm will comprise in the first initial phase of four 1.3 MW wind turbines. The project finance partners are the Danish Development Agency (Danida), the Central Energy Fund, and the Development Bank of South Africa. The Darling Wind Farm will be the first commercial wind farm in South Africa and in Southern Africa. The project is the first step to harvest the huge potential of wind energy, which is in abundance available for clean energy generation in Southern Africa.

The Power Purchase Agreement is part of a major Draft Energy and Climate Change Strategy of the City of Cape Town according to which it will source 10% of all its energy requirements from renewable energy by 2020. It comes at a time when the City of Cape Town has been experiencing repeatedly electricity shortages, and blackouts caused by technical and security problems in the only commercial nuclear reactor in Africa, situated very close to Cape Town in Koeberg.

Hermann Oelsner, CEO of the Darling Wind Farm said: 'The ratification of the Power Purchase Agreement is facilitating a unique and innovative partnership between local and foreign private investors, the National and the Local

Government and the community of Darling, which will be an equity shareholder in the project. This is the beginning of a totally new industry, in terms of Government's new initiative for job creation, with a high potential of local content in research and development, equipment manufacture, creation of infrastructure and operation of the plant. The Western Cape region may follow the success story of regions like in Denmark, in Northern Germany or in Spain where the wind industry already belongs to the biggest employers.'

The WWEA Secretary General Stefan Gsänger said: 'We see this first IPP wind farm in Africa as a milestone for the achievement of a sustainable energy supply in South Africa and for the whole of the African continent. WWEA would like to encourage the City of Cape Town and the South African Government to extend this approach of decentralised investment in the renewable energy sector and to harvest the abundant wind potentials that could supply all electricity that South Africa needs. South Africa should now set up appropriate national legislation for an accelerated wind power deployment. Once again, South Africa could thus underline its leadership function on the continent by encouraging the use of environmental friendly, inexhaustible

energy sources and by creating favourable conditions for a new industry, resulting in thousands of new, sustainable and high-qualified jobs.'

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Signing the PPA Agreement between the City of Cape Town and Darling Wind Farm (from left): Ms Helen Zille, Mayor of Cape Town, Mr Hermann Oelsner, CEO of the Darling Wind Farm, and Cape Town City Manager, Mr Achmat Ebrahim

# Energy events 2006

## NOVEMBER 2006

6 – 10

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Beijing, Tianjin, Shanghai, China

Website: [www.spintelligent-events.com/chinatours2006/en/index.php/](http://www.spintelligent-events.com/chinatours2006/en/index.php/)

7 – 9

### WESTERN AFRICAN POWER INDUSTRY CONVENTION 2006 Accra, Ghana

Website: [www.spintelligent-events.com.wapic2006/en/](http://www.spintelligent-events.com.wapic2006/en/)

14 – 16

### WESTERN AFRICAN POWER INDUSTRY CONVENTION 2006 Accra, Ghana

Contact: Spintelligent  
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### NORTHERN AFRICAN POWER INDUSTRY CONVENTION Sharm El Sheik, Egypt

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### THE 2006 EUROPEAN BIOFUELS FORM

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Website: [www.wraconferences.com/wra112overview.html](http://www.wraconferences.com/wra112overview.html)

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E-mail: [ctsm-courses@bbt.untwente.nl](mailto:ctsm-courses@bbt.untwente.nl)

## DECEMBER 2006

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### SUSTAINABLE RESOURCE MANAGEMENT Bruges, Belgium

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Website: [www.wupperinst.org/download/SRM-conf.pdf](http://www.wupperinst.org/download/SRM-conf.pdf)

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### THE RAVAGE OF THE PLANET 2006 – FIRST INTERNATIONAL CONFERENCE ON MANAGEMENT OF NATURAL RESOURCES, SUSTAINABLE DEVELOPMENT AND ECOLOGICAL HAZARDS Bariloche, Argentina

Contact: Rachel Green  
E-mail: [rgreen@wessex.ac.uk](mailto:rgreen@wessex.ac.uk)  
Website: [www.wessex.ac.uk/conferences/2006/planet06/index.html](http://www.wessex.ac.uk/conferences/2006/planet06/index.html)

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### 3RD FUTURE ENVIRONMENTAL TRENDS CONFERENCE ON “ENERGY, ENVIRONMENT, AND DEVELOPMENT – ANALYSING OPPORTUNITIES FOR REDUCING POVERTY”

Bangalore, India

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