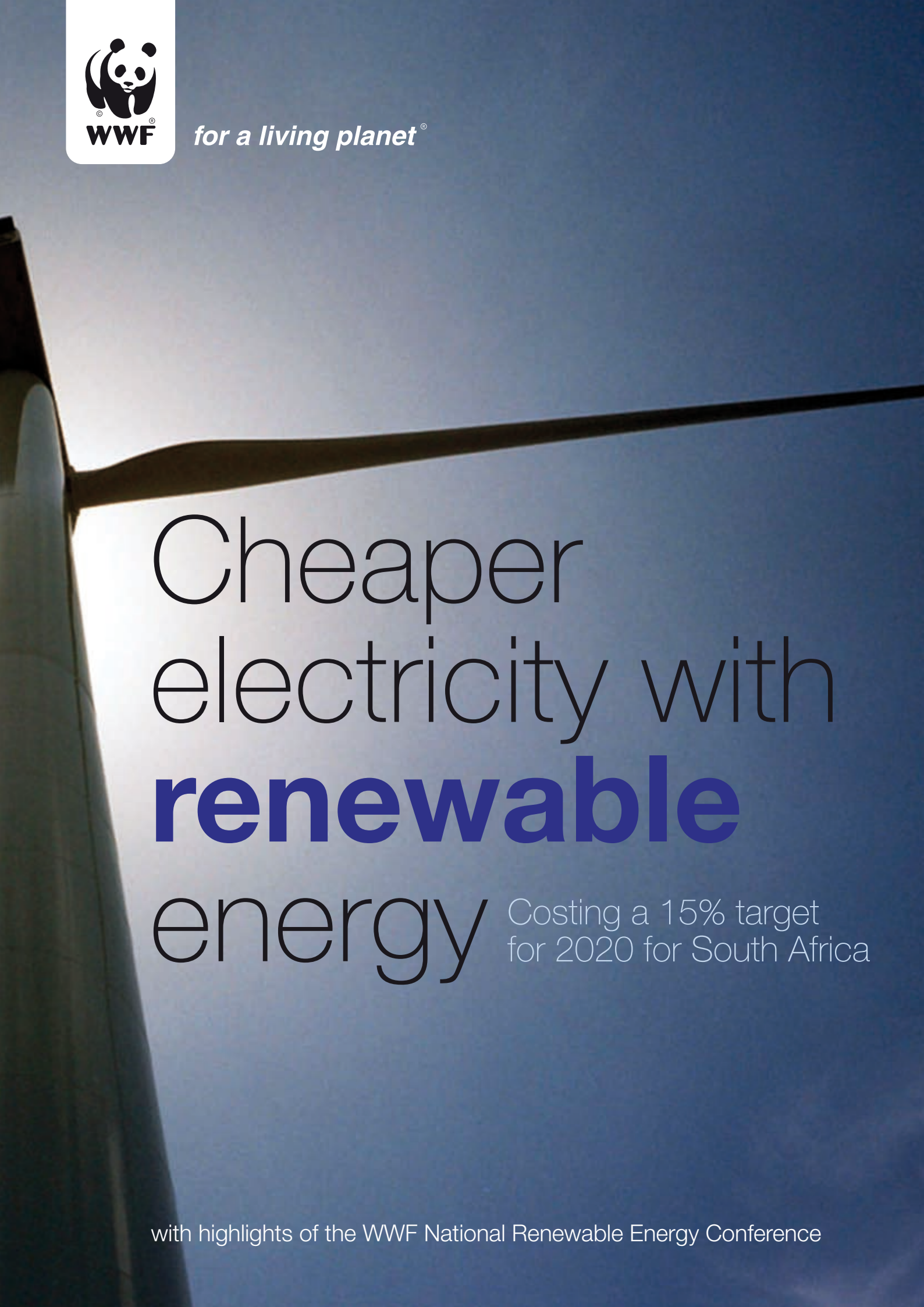


WWF

for a living planet®

Cheaper electricity with **renewable** energy

Costing a 15% target for 2020 for South Africa

with highlights of the WWF National Renewable Energy Conference

CONTENTS

"This is a welcome initiative. It is good to see such a range of stakeholders at this important event. We need to increase our ambition for utilising our abundant renewable energy resources. This will be good for growth and jobs, as well as the environment. Renewable energy technologies can also help us to achieve universal access to affordable energy services."

– Minister Buyelwa Sonjica

"The Long-Term Mitigation Scenarios (LTMS) process in South Africa tells us that there is not a choice between renewable energy and energy efficiency. To do what is "required by science" we need both. We also need policy that creates the market conditions to make it more profitable to save ourselves than kill ourselves. Science and economics must be applied to improve the well-being of our people, the prosperity of our economy and the future of our planet. Globally, investment in renewable energy is growing faster than any other sector. South Africa has a particular advantage in the abundant sunlight that could be harnessed for industrial-grade electricity and could still become a leading player in this emerging field. The bulk of the investment will come from companies and individuals, but government must act as the catalyst.

Algeria, Kenya, Mauritius and Uganda have beaten us to a renewable energy feed-in tariff (FiT), but the National Energy Regulator of South Africa has committed to ours being introduced by the end of February 2009. Just like we have to decouple our economy from ever-increasing resource consumption, we may have to consider a Department for Energy that is not structurally linked to Minerals. Projects like concentrated solar power (CSP) and Working for Energy, which address national sustainable development priorities, could be elevated to the status of "flag-ship national initiatives". This conference has motivated 15% of electricity come from renewables by 2020. This will require concerted commitment and enterprise. We will have to ensure that the mandates of our state institutions, including the national utility, the regulator, research institutes and standards bodies are clearly defined and complimentary with the short- and long-term interests of our people."

– Deputy Minister Derek Hanekom

DBSA Development Bank of Southern Africa

HEINRICH BÖLL STIFTUNG

NEDBANK

Norad

Dr Morné du Plessis,
CE, WWF South Africa

Cheaper electricity with renewables

By Dr Morné du Plessis, Chief Executive, WWF South Africa

It was with a great deal of expectancy and excitement that WWF South Africa organised our first National Renewable Energy Conference. The conference was attended by some of the country's leading experts in the field, as well as by senior representatives of government, including the Minister of Mineral and Energy Affairs, Buyelwa Sonjica, and the Deputy Minister of Science and Technology, Derek Hanekom. The presentations and subsequent working group discussions – as reflected in this document – provide concrete suggestions for South Africa to initiate the Cabinet-mandated transition to a low-carbon economy and society.

This Conference, with other initiatives for the reduction of South Africa's ecological footprint, represents a shift in the focus of WWF South Africa. From concentrating primarily on the conservation of the country's biodiversity and environmental resources, the organisation is increasingly engaging proactively with government, the private sector and civil society to promote economic growth and social development in a manner that is both equitable and environmentally sustainable.

This is in line with developments taking place in WWF offices across the world. The world's largest independent conservation organisation recently dedicated itself to the twin goals of protecting ecological capital and reducing humanity's footprint. In order to achieve these objectives, WWF focuses its global efforts on key Network Initiatives – the main thrust of these efforts is to mobilise significant levels of human and financial resources from across the world to address specific environmental issues.

WWF South Africa is participating in a number of these Network Initiatives. This conference was convened in the context of the **New Global Climate Deal**. The primary objective of this initiative is to ensure that an effective and equitable multilateral agreement is negotiated by parties to the UN Framework Convention on Climate Change by the end of 2009 and ratified by the end of 2012. South Africa has been identified as one of 11 priority countries in this Network Initiative and has enormous potential for early action, as demonstrated by the research report launched at the Conference and featured in this document.

In order to participate effectively in these Network Initiatives, WWF South Africa has embarked on a process of internal restructuring, which includes the creation of a **Living Planet Unit**. This Unit, which comprises of a Climate Change and a Trade and Industry Programme, with a Business and Industry Programme in development, will play a leading role in WWF activities to address environmental sustainability and the ecological footprint of South Africa.

It is my sincere hope that this publication and events such as the National Renewable Energy Conference contribute substantially to the transformation of South Africa's economy and development pathway, to realise a future in which – in line with WWF's mission – humans can live in harmony with nature.

Sustainable energy is more cost-effective for the nation

By Richard Worthington, WWF Climate Change Manager

South Africa has about a quarter of the world's best sunlight of all land mass (around 25% of the highest category of insolation, i.e. solar power potential). This national resource, as well as bountiful wind, ocean, sustainable biomass and locally relevant micro-hydro energy is ever present, but effectively ignored. The enormous socioeconomic value that can be realised by capitalising upon our renewable energy resources, at all levels, demands clear and urgent action.

Under current market conditions, it takes longer to realise financial returns on renewable energy investments than on fossil fuels. We are only starting to recognise our potential to join market leaders in renewable energy technologies (RETs), which are still enjoying the strongest global growth. If we want the local benefits and competitive positioning offered by a substantial RET industry, we need concerted action to grow from what is currently a very small base.

The electricity sector is the obvious spring-board for RET growth in South Africa, as the social costs of operating our current electricity generation technology are as extensive as the economic opportunities of starting to harness our renewable resources. Consistently higher employment rates in RET generation alone justify an ambitious RE programme. As a focused Sustainable Development Policy and enabling Measure (SD-PAM in climate-speak), it will provide a clear case for the kind of international support promised in climate change negotiations. We have so much potential; we just need to count the costs to see why and how we can mobilise investments.

In this context, WWF South Africa in 2008 decided to convene a national conference. It started as a 'symposium' to launch a research report: modelling the costs of an ambitious renewable energy target for South Africa for electricity generation under recent market conditions, building on the work of the Cabinet-mandated Long-Term Mitigation Scenarios process (LTMS). With the Department of Minerals and Energy (DME) having postponed the National Summit that was planned to review the 2003 White Paper on Renewable Energy, the level of interest and support through the WWF network, we held a successful two-day event attended by representatives of civil society, business and industry and government.

The main challenge was to what extent we could say: "Yes, we can." (It was the week in which an election was inspiringly won.) What do we really want to achieve and how quickly can we start to realise the benefits of sustainable energy investments? What are the barriers and how best do we make the case for the policies and measures that overcome them? What is the appropriate level of ambition for growing our sustainable energy sector?

The resolutions articulating the output of the working groups and plenary sessions, adopted by consensus and serving as the mandate for a "short-term task force" (an aspirational title for a small group of volunteers) appear on page 23. There was some trepidation about ambitions for institutional rationalisation, such as liberating energy from the minerals sector by splitting a department, but no hesitation in endorsing the 15% by 2020 target for electricity from renewable energy and the Working for Energy programme for meeting broader energisation and livelihoods objectives.

The costing research was commissioned by the Climate Change Programme of WWF South Africa, which is also part of the WWF International New Global Climate Deal Network Initiative, within a project called SNAPP: Supporting National Assessment of Policy Proposals for an effective and equitable post-2012 multilateral agreement on climate change. SNAPP is a partnership of WWF offices in Brazil, China, India and South Africa, with some financial support from the European Commission. The event was also supported by Norwegian (NORAD) funding of the Global Deal Network Initiative and kindly hosted by Nedbank.

South Africa has been playing a significant role in climate negotiations, being the first developing country to openly contemplate international "commitments" to mitigation[1] – seeking to break the stand-off between 'North and South'. The government statement of 28 July, reporting on a Cabinet Lekgotla that considered the LTMS, has received wide recognition as an innovative and appropriate developing country leadership position. However, there is a growing urgency for domestic policy to come in line with international positioning. For us to walk the talk, we need to start implementing our policy commitments.

1 In climate-speak we now talk of NAMAs (Nationally Appropriate Mitigation Actions) that are MRV (Measurable, Reportable and Verifiable) as part of the new deal, that must include support form the developed countries (as listed in Annex II of the Convention – UNFCCC) that is also MRV.

The ruling party's 2007 Polokwane Resolution on Climate Change is encouraging, with resolutions to "…promote the realignment of institutional mechanisms which will fast track the utilisation of renewable energy…" and "Escalate our national efforts towards … an ambitious renewable energy target."

However, the 1998 White Paper on Energy Policy for the Republic of South Africa (WPEP'98) was already quite specific: "Government policy on renewable energy is thus concerned with meeting the following challenges:

- ensuring that economically feasible technologies and applications are implemented;
- **ensuring that an equitable level of national resources is invested in renewable technologies**, given their potential and compared to investments in other energy supply options; and
- addressing constraints on the development of the renewable industry."

This is taken up in the July 2008 statement calling for:

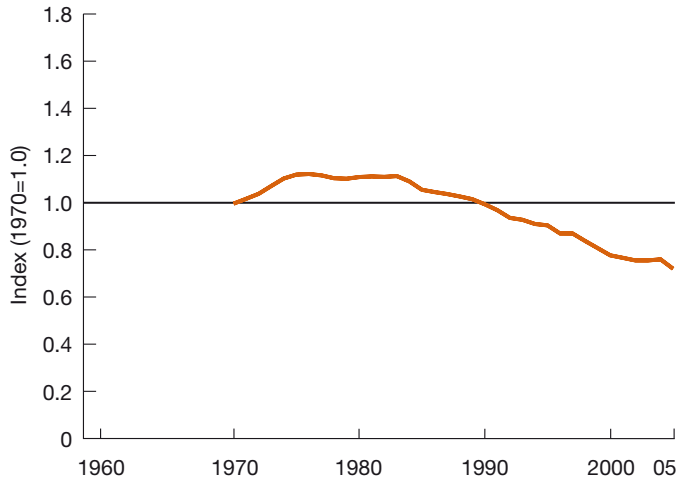
- "Laying the basis for a net zero-carbon electricity sector in the long term", and
- "Setting similar targets for electricity generated from both renewable and nuclear energy sources by the end of the next two decades."

Given the context of the target (at that time) of 20 000 MW of nuclear plant by 2025 within a total capacity of 80 000 MW, this means a renewable target similar to a quarter of total supply in 2028.

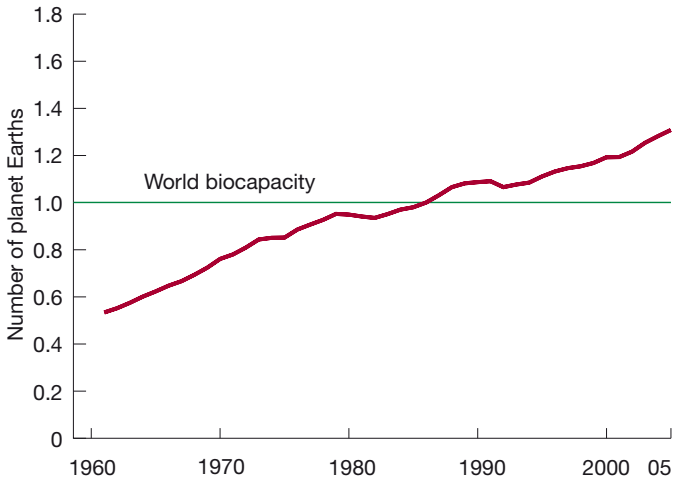
This should signal that we are ready to shift from the easy, short-term profits offered to fossil fuel users through externalisation of real costs. However, the 'Externalities Study' that was intended to inform Integrated Energy Planning (IEP), which the DME twice put out to tender, was "put into abeyance" along with the whole IEP process, in September 2006. Both should be resumed as a matter of urgency.

Lack of robust data should not, however, blunt our ambition. International trends are clear enough. The Living Planet Report clearly indicates the unsustainability of traditional development pathways, with energy being the greatest contributor to a global footprint 30% higher than the carrying capacity of our planet:

Living Planet Index (of global biodiversity), *1970–2005*

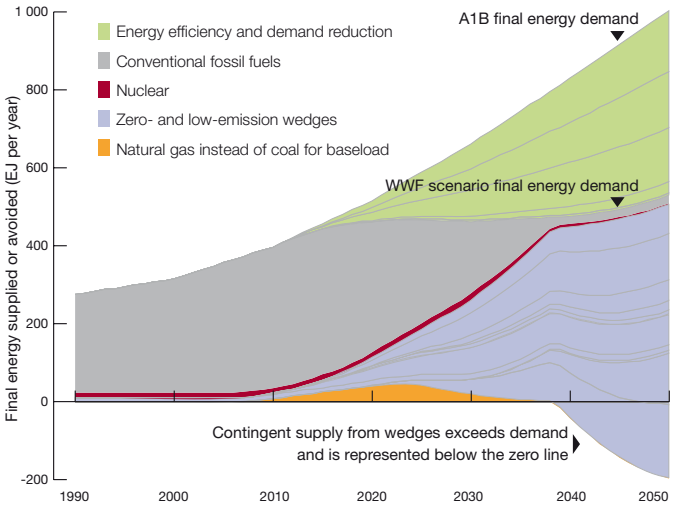


Humanity's Ecological Footprint, *1970–2005*



The report also provides a sketch of the global solutions, based on the work of several expert panels, including input by the International Energy Agency:

Output of the WWF Climate Solutions Model



WWF South Africa's Living Planet Unit has identified renewable energy as a top priority, not only to serve traditional electricity demand and energisation[2] goals, but also for sustainable transport solutions. Mobility of the populace is not well served by the inefficient internal combustion engine, nor are our lungs, water or soil well served by the burning of fossil fuels. The most resource-efficient means of meeting transport service needs with available technology and infrastructure requires the inherent energy-efficiency of electric motors. Expanding the role of electricity as an energy carrier in the national supply mix provides a further imperative for sustainable and clean generation options. Their potential for relatively rapid delivery (short project lead-times) means we won't need new coal-fired plants to electrify transport.

The case for renewable energy is particularly strong under the paradigm of a developmental state, since the opportunities for local community participation, maximising the use of locally owned resources, is consistently higher than for 'stock' or finite energy sources (fossil and nuclear fuels). Additionally, the direct employment benefits are indicated by a study conducted by AGAMA Energy in 2005, which found the following rates of job creation, shown per unit of installed generation capacity and against electricity despatched:

Conventional energy technologies	Direct jobs per		Renewable energy technologies	Direct jobs per	
	MW capacity	GWh generated		MW capacity	GWh generated
Coal (current)	1.7	0.3	Solar Thermal	5.9	10.4
Coal (future)	3.0	0.7	Solar PV	35.4	62.0
Nuclear	0.5	0.1	Wind	4.8	12.6
Nuclear PBMR	1.3	0.2	Biomass	1.0	5.6
Gas	1.2	0.1	Landfills	6.0	23.0

There are, however, many who would still restrict renewable energy to 'niche' applications. The conference identified several myths about renewable energy options that are still peddled in the corridors of power (see page 23). Putting public benefit before profit is a prevailing political challenge

2 *'Energisation' is an objective of WPEP'98 – ensuring that all South Africans have access to appropriate and affordable energy services for basic needs and productive activity.*

"If we continue with business-as-usual, we will go out of business."

– Marthinus van Schalkwyk, Minister of Environmental Affairs

in all fields of endeavour, but nowhere more urgent than in how we access energy. The confluence of fossil fuel impacts and price volatility (not to mention military spending to secure access) make a compelling case for rejecting business-as-usual. Fortunately we can reverse the depletion of natural capital with market-corrective measures, such as South Africa's promised levy on non-renewable electricity generation. There is also growing coherence around new paradigms for our global financial architecture emerging through climate change negotiations.

The modelling work of the University of Cape Town's Energy Research Council (ERC), particularly the rigorous work for the LTMS, has confirmed civil society's long-held conviction that a just transition to sustainable energy supply is not more expensive for the nation, but rather more cost-effective. This work emboldened Cabinet to commit to stabilising national greenhouse gas emissions between 2020 and 2025. A presentation at the December 2008 negotiations under the UN Framework Convention on Climate Change suggested that emissions should plateau at 550 Mt CO_2 equivalent.

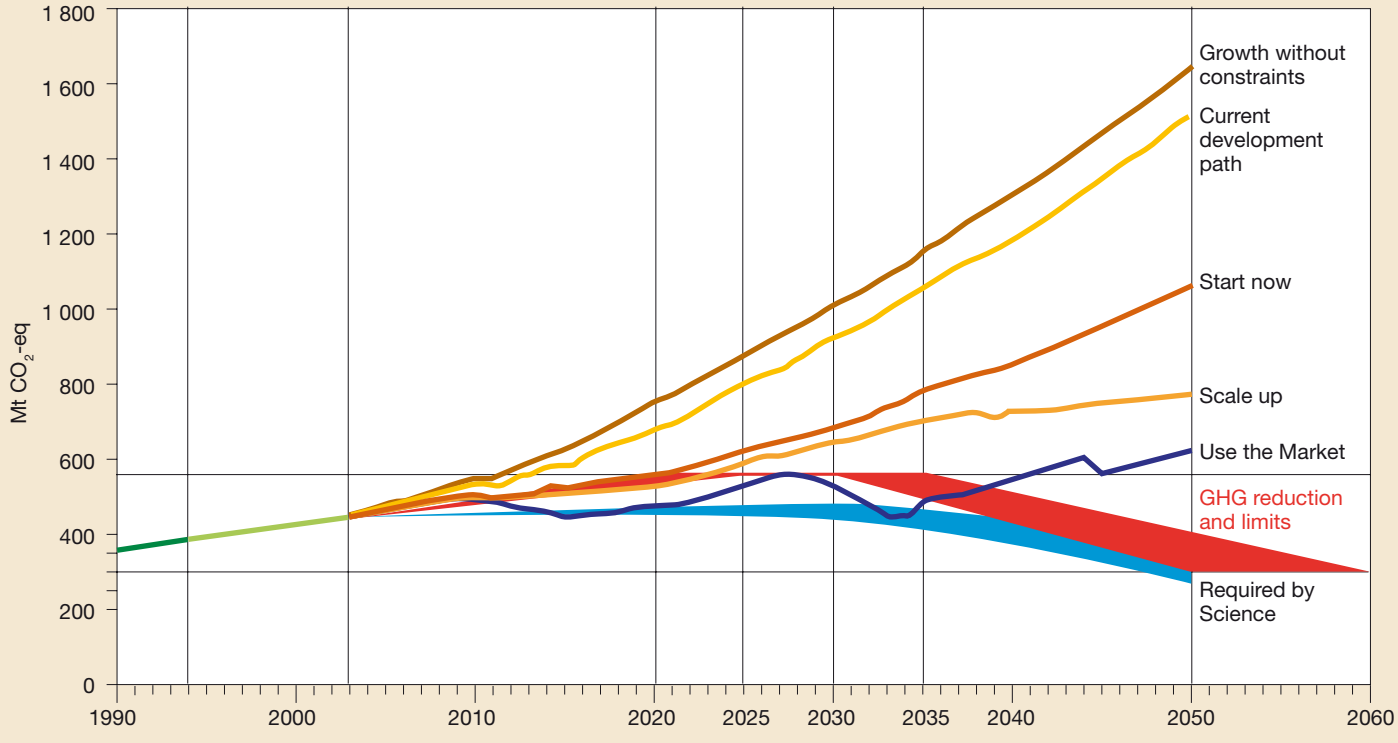
The LTMS graph below shows in red the emissions range that South Africa is proposing to stay within, given international support. This overlays a number of possible emissions trajectories, from unrestricted business-as-usual at the top, through reductions expected from three sets of interventions improving on current development plans, to the lowest band in blue, which would bring us broadly in line with reductions required within an effective international mitigation effort.

Even the lowest emissions trajectory – reducing to about half of current emissions by 2050 – assumes a lot of leeway for South Africa, as a developing country. Given the need for global emissions to peak in 2015 and to be reduced from 1990 levels by 80% by 2050, the proposal for South Africa to reduce to 300Mt per annum between 2050 and 2060 is indeed the least we must achieve. Perhaps most significant is the LTMS conclusion that there is only one credible future scenario for South Africa: to transform in line with what is 'Required by Science'. In the words of Minister Marthinus van Schalkwyk, "If we continue with business-as-usual, we will go out of business."

This latest research report simply indicates how an ambitious medium-term renewable energy target, as part of an intervention that includes improved efficiency, could actually reduce the escalation of electricity prices, assuming some accounting of the costs of carbon emissions. The Working for Energy programme suggests that the same trend can be brought to bear on non-electric energy service delivery through renewable inputs. If we start now "ensuring that an equitable level of national resources is invested in renewable technologies" (WPEP'98), we will quickly realise a range of local benefits and soon attract international investment.

The key message that we hope this publication will convey is that we can afford to make renewable energy development a leading national priority, even without carbon finance. Moreover, commitment to an ambitious medium-term target can attract international financial support for our sustainable development.

LTMS modelled and proposed emissions trajectories



Costing a 2020 target for 15% renewable electricity in South Africa

An overview of the report of the independent study undertaken by Dr Andrew Marquard, Bruno Merven and Emily Tyler, Energy Research Centre, University of Cape Town

EXECUTIVE SUMMARY

The study explores the implications of a renewable energy (RE) target for South Africa to generate 15% of electricity from renewable resources by 2020. We report on the effects of 15% renewable electricity on the total cost of electricity production, investment in electricity infrastructure, and national greenhouse gas emissions. Achieving such a target will pose institutional, financial and policy challenges and several options were considered. The two most promising technologies for South African conditions are wind and solar thermal electricity.

The study used the modelling framework of the recently-completed Long-Term Mitigation Scenarios (LTMS). During the course of the study, new research on wind resources in South Africa was encountered which indicates that the potential for wind power is far greater than previously thought. Since these findings are relatively new, both the LTMS assumptions and the new assumptions were used to get a range of costs for a large-scale wind energy programme.

A number of scenarios were modelled to explore various ways in which the target of 15% could be met, what impact high or low wind resource assumptions had on the target, and what impact an energy efficiency programme would have on the costs of the target. The most promising scenario is a mix of solar thermal and wind, which benefits both from the lower cost of wind and the ability of solar thermal plants to contribute to peak demand.

Key findings:

- **Reaching a 15% renewable target by 2020 will not cost the earth: by 2020 average electricity costs will only be slightly higher (about 15%) than the baseline (the business-as-usual scenario).**
- **Combined with an energy efficiency programme, average electricity costs will be lower than the baseline for most of the 2015-2020 period.**
- **With the addition of carbon finance for both the efficiency programme and the renewable programme, average electricity costs will drop to 18% below the baseline by 2020.**

Emissions reductions for all RE scenarios were similar: around 165 Mt of CO_2-eq over the period (2006-2020), with reductions of up to 400Mt when combined with an energy efficiency programme. By 2020, annual greenhouse gas (GHG) emissions reductions from achieving the RE target would be 14% for the electricity sector, constituting 6.5% of total national emissions.

The modelling indicates that by itself, such a programme would have less of an impact on the electricity price than the 2008 tariff increase. The alternatives to electricity supply from coal in South Africa are renewable energy and nuclear. This study indicates that the renewables option is cheaper than nuclear. Indeed, if partner programmes such as efficiency are also implemented, the overall cost of renewables will be lower than business-as-usual.

Four areas were identified where partner programmes would help reduce costs:
- research and development;
- infrastructure development;
- industrial strategy; and
- energy efficiency.

An industrial strategy based on a) increasing the local content of renewables plants, and b) developing a competitive edge in solar thermal technology internationally, would funnel much of this investment back into the local economy. This would create more jobs than current plans and ultimately earn significant export revenue as the rest of the world attaches much greater value to low-carbon energy sources. If carbon finance is added, the picture becomes even more positive. Tradable 'white' certificates for energy savings are another promising option for financing the numerous benefits of efficiency, including: creating employment, saving the country money and avoiding the risk of blackouts up to at least 2012.

The main challenge – financing the renewable electricity programme – could be accomplished through a feed-in tariff, tradable renewable energy certificates, international climate-related finance, and subsidies for technology development. Support for technology, finance and capacity for developing countries is promised as part of the future of the international climate agreement, due to be negotiated by end of 2009. In order to meet the target, however, planning should start immediately and conclude by 2010. Optimal implementation would require sophisticated policymaking and a high degree of coordination between key stakeholders.

South Africa has the necessary institutional, technical and physical infrastructure to achieve this. Committing the nation to such a target would give substance to South Africa's leading position on international climate change response. It would make renewables, possibly packaged as a set of Sustainable Development Policies and Measures (SD-PAMs), part of measurable, reportable and verifiable (MRV) mitigation actions, which would thus qualify for the MRV support promised to developing countries in Bali in December 2007.

Explaining a 2020 target for 15% renewable electricity

Further details of the scenarios and modelling results:

The model of the South African energy system used for this study is a partial equilibrium linear optimisation model developed by the Energy Research Centre (ERC) of the University of Cape Town for the LTMS Scenario Building Team (Hughes *et al* 2007; Winkler 2007). The modelling platform used is MARKAL, developed by the International Energy Agency (IEA). MARKAL is an optimising model: subject to available resources and a set of required energy services specified by the modelling team, the model determines the optimal configuration of the energy system in terms of an objective function, usually to minimise costs, subject to constraints. The model ensures that energy system requirements are met, e.g. that energy demand is equal to supply; that a specified reserve margin is maintained and that technologies have a limited life.

It was assumed that delivery of the target will begin in 2015, when the first new renewable plants will come online and produce 2.5% of South Africa's electricity, which will increase linearly until reaching 15% in 2020. Earlier implementation at scale would require (given plant availability assumed in the model) shutting down existing plants or postponing planned investment.

The extremely low reserve margin between now and 2014 suggests scope for a significant pilot programme, as well as for deployment of smaller-scale renewable technologies such as biomass plants. For the first plants to come online in 2015, the planning process for wind would have to begin around 2010 and possibly before this for solar thermal plants, given the lead time of new plants and the requirement to undertake planning and environmental impact assessments (EIA). Another important factor is technology learning: we have used the same model for technology learning developed for the LTMS, but have used more conservative assumptions for wind energy from the IEA's 2008 Energy Technology Perspectives. Nevertheless, by 2015 renewable technology is, in the model, considerably cheaper than it is today.

Since it would be perverse for any government to set such a target (involving additional costs) without also implementing an energy efficiency programme (which lowers demand and defers investment, thus lowering costs), we have also modelled some combined efficiency and renewable options to investigate the impact on the costs of the target within such a programme. The impact of the energy efficiency programme is significant, resulting in the postponement of the second planned new coal plant. We have also modelled a nuclear alternative, to investigate the comparative costs of a nuclear and a renewable programme up to 2020. Although government has called for both technologies in the South African system, it is unlikely that both a renewable and a nuclear programme can be accommodated up to 2020 without underutilising generation capacity.

ELECTRICITY SUPPLY: THE DIFFERENT SCENARIOS

(All numbering of tables and graphs as per full research report)

Three cases for 15% renewable supply were modelled:

- **Case 1:** Wind power modelling using the same assumptions as the LTMS on South Africa's wind resource.
- **Case 2:** Wind power modelling using new and more optimistic research on South Africa's wind resource.
- **Case 3:** Model constrained to use an equal amount of wind and Concentrating Solar Power (CPS) using the more optimistic wind resource assumptions.
- **Cases 1A, 2A and 3A:** same as above, but in conjunction with a demand-side (consumer use) energy efficiency programme.

The model, in the reference case (the baseline), shows additional capacity of just over 12GW required up to 2020. Wind options require more installed capacity to ensure the same availability. In the scenarios without energy efficiency, between 43% and 76% of new coal capacity is displaced (depending on the different share of wind and therefore of additional peaking capacity required) and with energy efficiency, this rises to between 57% and 94%.

Table 2 – *New generation capacity in GigaWatts (GW) for each scenario, commissioned from 2015-2020*

	Coal	Wind	Solar thermal	% new coal displaced
Reference	12.17	0.00	0.00	–
Case 1	2.94	8.76	6.90	76%
Case 2	6.92	18.27	0.00	43%
Case 3	4.03	9.08	5.09	67%
Case 1A	0.74	5.76	7.26	94%
Case 2A	5.19	16.43	0.00	57%
Case 3A	2.51	8.29	4.59	79%

Table 3 – *Reserve margin, peak demand and installed capacity*

	AF reserve margin[1]	Peak demand (GW)	Total installed capacity (GW)
Reference	15%	57.48	66.18
Case 1	14%	57.48	72.61
Case 2	18%	57.48	79.2
Case 3	16%	57.48	72.21
Case 1A	15%	53.04	65.6
Case 2A	19%	53.04	73.46
Case 3A	17%	53.04	67.23
Nuclear	15%	57.48	66.46
Nuclear efficiency	**17%**	**53.04**	**62.39**

1 In calculating the reserve margin (the spare generation capacity), an Availability Factor (AF) has been used to add built capacity, which is 1 for all plant except wind, where it is 0.23 for the lower resource estimate, and 0.39 for the higher availability factor.

COSTS AND INVESTMENT REQUIREMENTS (All numbering of tables and graphs as per full research report)

Costs have been calculated in several ways, to make as detailed a comparison as possible between the different scenarios. Two basic approaches have been used. The first is the method used in the LTMS to estimate the cost of mitigation (measured in R/tonne of CO_2-eq mitigated). This approach uses the total incremental system costs, which are annualised (discounted and then levellised), and then divided by the total average CO_2-eq mitigated, which is an internationally-accepted approach for comparing mitigation costs of alternative measures. The second approach uses the model output (capacity expansion and electricity production) to calculate direct costs in the electricity sector from the input costs. Three cost measures are described below:

1. **Investment costs**, which represent the present value of investment in the year before a new plant is commissioned. These form a good basis for comparing investment requirements, but are only an approximate reflection of the timing of the investment. (Due to the lower lead time for renewables, these are more accurately reflected, whereas the timing of coal investments, for example, is inaccurately close to the point at which the capacity comes online.)

2. **Total undiscounted annual electricity production costs**, consisting of annual fuel costs, annual operation and maintenance costs, and annualised capital costs for new capacity (over the period of the lifetime of a new plant). This provides a useful indicator of the difference between costs in the reference case and the other cases.

3. **Average annual electricity production costs per kWh** – costs in (2) are used to calculate average annual cost of production per kWh, which is a proxy for understanding the impact of the target on the electricity price. It is not possible to predict the electricity price from the model output, since this depends on regulatory policy and accounting policy, but this cost is a useful indicator of a price trend for the energy component of the electricity price, which in 2004 was around 60% of the average electricity price.

The impact of carbon finance on the average cost of electricity is calculated for Cases 1 to 3, using two carbon prices: 10 euros per tonne, and 20 euros per tonne (in current terms).

All costs are expressed in 2003 Rands. Costs can be converted to 2008 Rands by multiplying by the relevant PPI ratio (in this case, about 180/124, where 180 is an estimate of the PPI for 2008).

The mitigation costing shows changes from the reference case both in terms of an average cost (or cost saving with efficiency) per tonne of avoided CO_2 emissions, and as a change in the over-all cost of electricity supply as a percentage of GDP (as an annual average over the modelled period). The savings come not only from avoided electricity investment and production, but also because less renewable capacity would be required to meet the 15% target due to the lower baseline.

Table 7 – *Mitigation costs using annualised total incremental system costs*

	Rands per tonne	Incremental costs as a % of GDP
Case 1	R141	0.10%
Case 2	R101	0.08%
Case 3	R104	0.08%
Case 1A	-R32	-0.05%
Case 2A	-R37	-0.07%
Case 3A	-R39	-0.07%
Nuclear	R105	0.09%
Nuclear efficiency	-R17	-0.03%
Efficiency alone	-123	-0.14%

Investment requirements are identical until 2012, when the scenarios begin to diverge. In the efficiency scenario, due to the delay of a new plant from 2013 because of lower demand, investment levels are considerably lower than in the reference case (only investments required in the electricity sector have been considered).

Table 8 – *Power sector investment requirement, 2012–2019 (millions of 2003 Rands)*

	2012	2013	2014	2015	2016	2017	2018	2019
Reference	27 283	38 480	28 701	18 332	21 487	22 388	23 284	23 959
Case 1	27 283	38 480	42 283	40 124	46 747	49 156	52 599	55 048
Case 2	27 283	38 480	43 766	32 426	35 834	33 669	36 305	37 449
Case 3	27 283	38 480	39 768	45 094	36 407	41 397	44 776	46 001
Case 1A	19 302	22 785	24 531	34 378	44 621	46 299	48 417	50 929
Case 2A	19 302	22 785	29 842	29 500	33 129	29 541	31 697	33 140
Case 3A	19 302	22 785	26 925	34 448	37 158	38 601	39 743	40 850
Nuclear	27 283	38 480	28 894	29 896	39 617	41 400	42 985	44 768
Nuclear efficiency	19 302	22 785	13 248	33 478	47 541	38 033	37 835	39 221
Efficiency alone	19 302	22 785	18 789	15 540	18 680	19 482	20 279	21 071

Investment costs

The impacts on the investment costs of electricity generation of eight variations, shown below, from the reference case (business-as-usual) up to 2020, are indicative of the 'front-loading', or high initial capital costs of renewable energy technology deployment.

Figure 9 – *Percentage increase in investment costs for Cases 1 to 3 and nuclear*

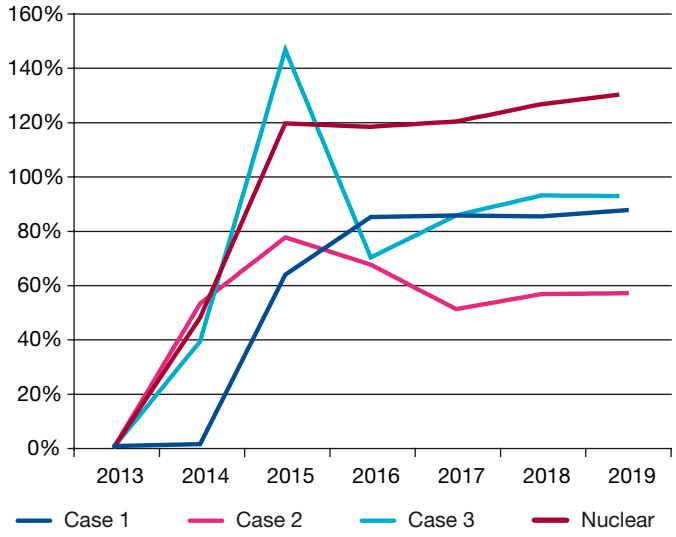
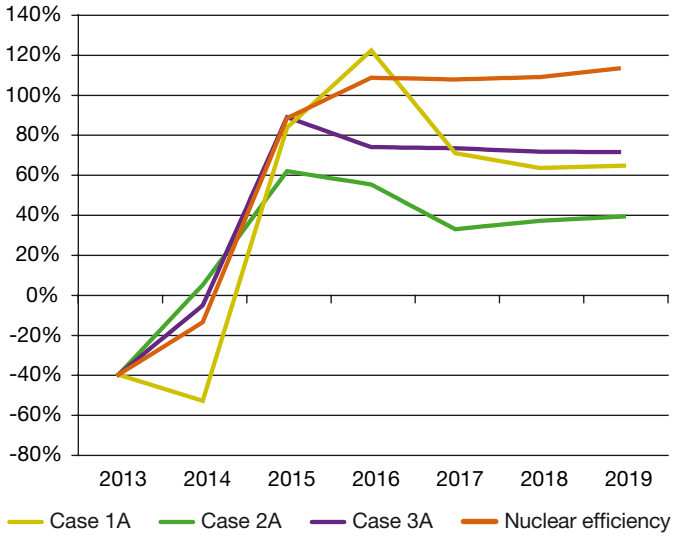


Figure 10 – *Percentage increase in investment costs for Cases 1A to 3A and nuclear efficiency*



Total annual electricity production costs

When capital costs are spread over the lifetime of the plant, to portray annual electricity production costs relative to the reference case, nuclear costs are the highest by 2020, which is a result of the combined impact of escalating nuclear fuel prices and the assumption that no technological learning takes place (the observed trend in relation to costs). With the efficiency programme, the total costs only exceed the reference case in 2018, whereas without the efficiency case, costs are 15 – 20% higher by 2020.

Figure 11 – *Percentage increase in total annual electricity production costs, Cases 1 to 3 and nuclear*

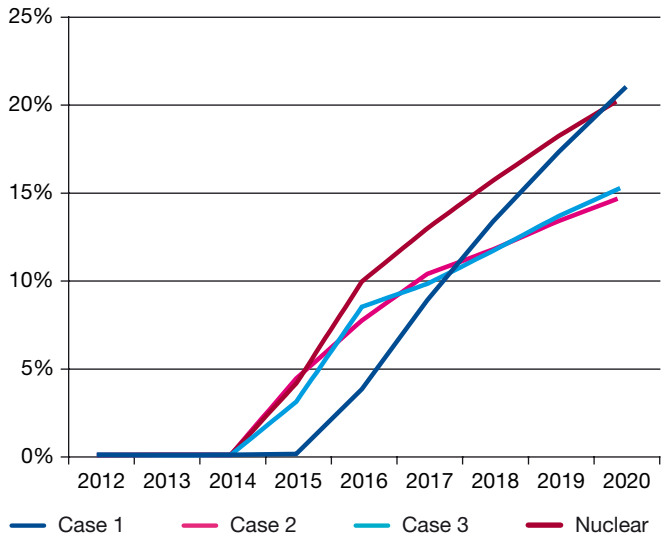
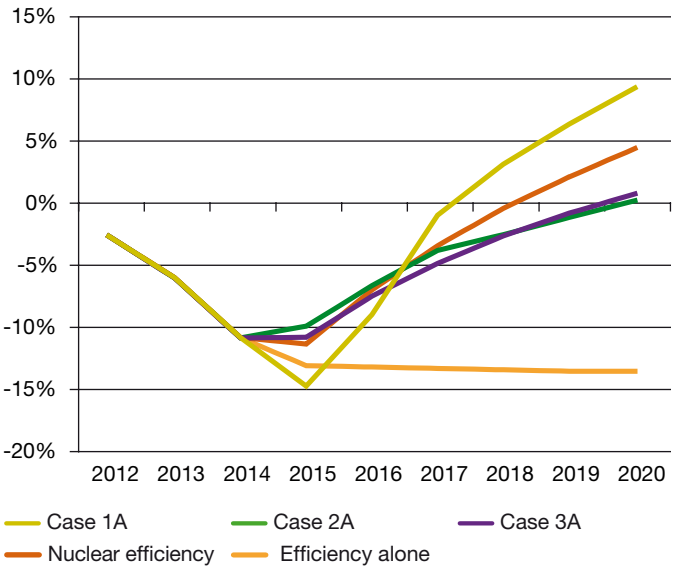


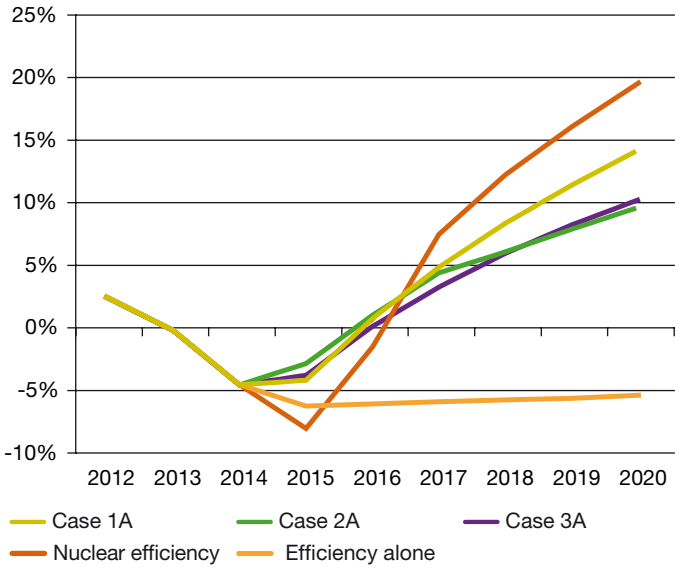
Figure 12 – *Percentage increase in total annual production costs, Cases 1A to 3A, nuclear efficiency and efficiency alone*



Average cost per kWh

This indicator is a proxy for price increases. The actual average price increase would be significantly lower, as this analysis is concerned only with the cost of producing electricity and not with the transmission or distribution costs. In the reference scenario, the cost of producing electricity increases by 2.13 times from 2006 to 2020 in real terms. In other cases, the increase is greater: between 2.45 and 2.56 times for the renewable scenarios, and 2.57 for the nuclear scenario, without efficiency. For the efficiency scenarios, the increase is between 2.34 and 2.42 for the renewables scenarios, and 2.54 for the nuclear scenario:

Figure 4 – *Percentage change from reference in average cost of electricity for Cases 1A to 3A and nuclear efficiency*



CARBON FINANCE
(The international trading of carbon credits)

Up to end 2012 the Clean Development Mechanism provides a revenue stream for both renewable energy and efficiency interventions; thereafter a more robust carbon market, including sectoral options, is anticipated under the post-2012 multilateral climate change regime, scheduled to be agreed in Copenhagen in December 2009. This could be complimented by a domestic carbon tax. A carbon price of Euro 10/tonne CO_2 in 2012 is widely considered to be conservative and major price escalation can be expected by the end of the modelled period. All avoided coal emissions were paid at the average rate of avoided emissions per kWh for all three scenarios, which was 1.058 kg/kWh of renewable electricity generated.

Figure 17 – *Impact of a Euro 10 carbon price on the % change from reference in average cost of electricity for Cases 1A to 3A (with carbon finance for energy efficiency as well)*

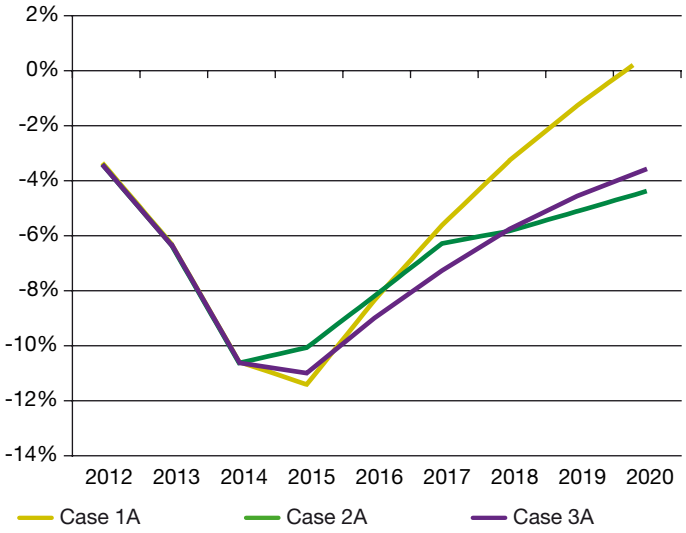
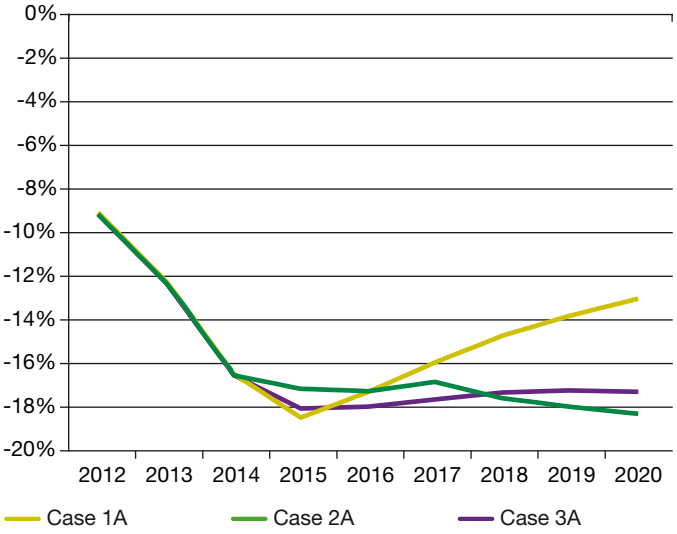


Figure 18 – *Impact of a Euro 20 carbon price on the % change from reference in average cost of electricity for Cases 1A to 3A (with carbon finance for energy efficiency as well)*



A clear, certain and mandatory target is crucial to the success of the renewable energy programme.

CONCLUSION
(verbatim from the independent study)

A renewable energy target of 15% for 2020 comprising wind and solar thermal energy, particularly if combined with partner programmes such as an energy efficiency programme, will provide significant greenhouse gas mitigation, together with air quality, health and ecosystem service co-benefits to South Africa. There are also opportunities for the country to develop a competitive advantage in solar thermal technologies, and establish South African industry and technicians as front-runners in this area of the rapidly expanding international renewable energy sector.

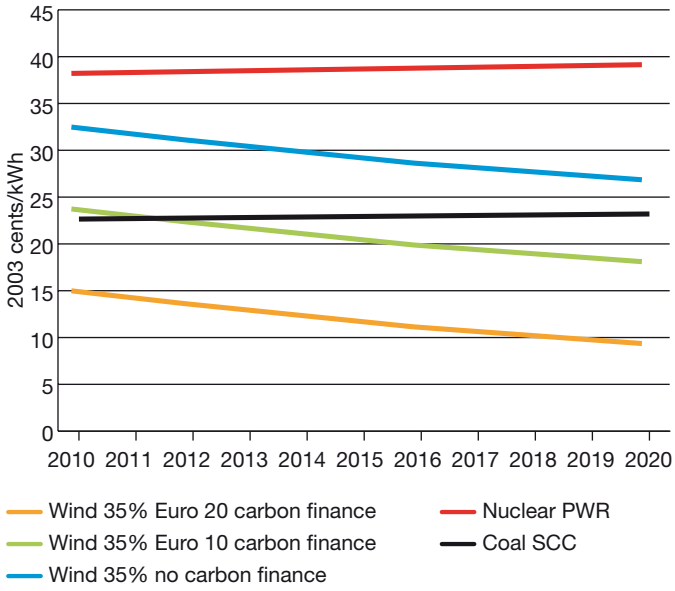
The additional costs are likely to be financed predominantly through carbon markets, or supported as an SD-PAM, and could also be offset against savings from energy efficiency. Remaining additional costs can be allocated to electricity consumers. There is also scope for direct grant funding from government for technology development programmes.

A clear, certain and mandatory target is crucial to the success of the RE programme. This target must be supported by a well developed regulatory framework. It is proposed that this framework is comprised of a feed-in tariff for wind in the first instance, extended to solar thermal once the tariff mechanism is proven, combined with subsidies and tax incentives for the development of the solar thermal technology, and investment in expertise, capacity and capability as leaders in this international sector. An energy efficiency trading scheme is proposed as the foundation for achieving the industrial energy efficiency target.

While this study makes the general case for considering such a target, further studies should explore a potential programme in more detail, especially in terms of investment requirements and mechanisms. Other areas which could be explored include technical options such as storage systems, more in-depth analysis of risks associated with power sector investments (including using other approaches such as portfolio approaches, and assessing the risks arising from current investment patterns), as well as the implications of different planning approaches emphasising distributed generation.

Figure 19 gives an indication of the impact of two different levels of carbon price on the levellised cost of 35% availability wind. The impact on solar thermal plants would be similar, i.e. the levellised costs would be reduced by the same amount.

Figure 19 – ***Impact of carbon finance on levellised costs of wind***



Pictured from left to right:

1. *Saliem Fakir, Head: Living Planet Unit, WWF-SA.*
2. *Alistair Schorn, International Programme Manager, WWF-SA; Richard Worthington, Climate Change Manager, WWF-SA; Cheryl Carolus, Executive Chairperson of Peotona Group Holdings; Simon Steward, Managing Director of Suregas; Jenny Williams, Corporate Relations, WWF-SA; Tasneem Essop, International Climate Policy Advocate, WWF-SA; Peet du Plooy, Trade and Investment Advisor, WWF-SA; and Dr Morné du Plessis, CE of WWF-SA.*
3. *Cheryl Carolus, Executive Chairperson of Peotona Group Holdings.*
4. *Kevin Whitfield, Head: Nedbank Capital; Christina Golino, Unit Manager: Knowledge Management, (DBSA); Bishop Geoff Davies, Coordinator of the Southern African Faith Communities' Environment Institute; Brigitte Burnett, Head: Sustainability Within the Cluster Enterprise, Governance & Compliance, Nedbank.*
5. *Noma Qase, Director for New and Renewable Energy, Department of Minerals and Energy, and Dr Guy Preston, Working for Water.*
6. *See pictures 2 and 4 for details.*
7. *Minister Buyelwa Sonjica, Department of Minerals and Energy.*


2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7

THURSDAY 6th – DAY 1

10:00	**Welcome:** Richard Worthington, WWF Living Planet Unit		
10:15	**Keynote address:** Deputy Minister Derek Hanekom, Department of Science and Technology		
10:45	**Costing a 2020 target for 15% renewable electricity in South Africa:** Dr Andrew Marquard, research lead author, Energy Research Centre, University of Cape Town		
11:30	**The renewable energy resource and knowledge base:** Prof Wikus van Niekerk, Director, Centre for Renewable and Sustainable Energy Studies (CRSES), Stellenbosch University		
12:15	Plenary comment and discussion		
12:40	LUNCH		
13:30	**Proposed feed-in tariff system for South Africa:** Sibusiso Zungu, senior engineer, EIP and Tembani Bukula, National Energy Regulator of South Africa (NERSA)		
14:00	**Evolution One Fund, private equity for renewable energy in Southern Africa:** Christopher Clarke, Inspired Evolution Investment Management		
14:15	**Working for Energy:** Dr Guy Preston, Chairperson, Working for Water		
14:45	TEA/COFFEE		
15:00	**Setting up commissions:** finalisation of themes, topics, objectives and outputs		
15:30	**Electricity from renewable resources** **Wind potential:** Kilian Hagemann (UCT) and **Solar potential:** Sterren Bester	**Biomass energy** **Working for Energy:** Dr Guy Preston and **Biomass energy:** Annie Sugrue	**Solar water heating**
17:15	Working groups review progress and appoint ‘drafting’ team members		
17:30	Informal networking with pre-dinner drinks		
18:30	Gala dinner: Welcome by Dr Morné du Plessis, CE of WWF-SA		
18:40	Hosts welcome: Kevin Whitfield, Head, Nedbank Capital		
18:45	Pre-dinner address: Kadri Nassiep, CEO of SANERI		
19:30	Keynote address: Minister Buyelwa Sonjica, Department of Minerals and Energy		
20:00	Entertainment: BuskAid		

FRIDAY 7th –DAY 2

09:30	**DBSA Renewable Energy Market Transformation Programme:** Moses Chundu
10:00	**Energy and climate targets – action and strategies from the Western Cape:** Mark Gordon, Director SEM, Department of Environmental Affairs
10:30	**South African Wind Energy Project:** André Otto (DME)
11:00	Commissions reconvene and consider key conclusions, with an additional working group on advocacy and a short-term task force
11:45	**“Lessons from Iceland”, including myths regarding RE:** Peter Lukey (DEAT)
12:10	Report-back on commission highlights (including tabling inputs to drafting team)
12:40	LUNCH – and conversion of commission output to draft resolutions
13:30	Plenary presentation, discussion and adoption of resolutions, facilitated by Tasneem Essop, WWF International Climate Policy Advocate
14:50	**Closing address:** Deputy Minister Derek Hanekom
15:15	Thanks and farewell

Particular thanks to the reporters and commission facilitators, including: Leila Mahomed, Stefan Wiswedel and Sivuyile Maboda (Sustainable Energy Africa (SEA)); Dorah Lebelo (GreenHouse Project); Saliem Fakir and Prof Wikus van Niekerk (CRSES), Stellenbosch University; Gary Pienaar (IDASA); Glynn Morris (AGAMA Energy); Rehana Dada and Kirkpatrick & Associates.

The Environmental Goods and Services Forum

By Peet du Plooy, WWF Trade and Investment Advisor

The Environmental Goods and Services (EGS) sector comprises companies whose business is to improve the efficiency with which we use our natural resources and/or to protect, manage and grow our natural capital. EGS include a variety of activities, such as renewable energy, energy services, water treatment, the protection of biodiversity, waste management, pollution control and legal and consulting services related to ecological sustainability.

Globally, by 2004, this was already a $548bn industry. It is expected to grow to $688bn by 2010 and $800bn in 2015. South Africa has a disproportionately small share of this market (compared to its global share in other industries): the local industry has been estimated in a report to Nedlac in 2006, to be worth between R14.5bn and R23.2bn (1% to 1.6% of GDP and less than 0.4% of the global market). By far the majority of the local market to date has been in waste management.

While leading large and multinational companies operating in South Africa are developing their own EGS offerings (like Siemens, who builds wind turbines here and exports them to the world), many EGS companies are small and medium-sized enterprises (SMMEs). Only some of the sub-sectors have representative industry bodies and these seldom collaborate.

The Department of Trade and Industry (DTI) has identified EGS as a potential growth sector with a positive contribution to national sustainable development goals. In order to support the realisation of this potential, the department has established an EGS sector desk to develop a customised sector programme for the industry.

Initiated by the DTI, the South African EGS Forum was launched in August 2007 at the Development Bank of South Africa, with the aim of providing a single platform for the industry to collectively lobby government for industry support.

WWF supported the event with the release of a publication titled “Rethink Investment in (South) Africa”, which calls for foreign investment in EGS for South Africa and the continent as a whole. WWF encourages all EGS companies to join the Forum.

For EGSF membership enquiries contact:
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or Andrea Firth
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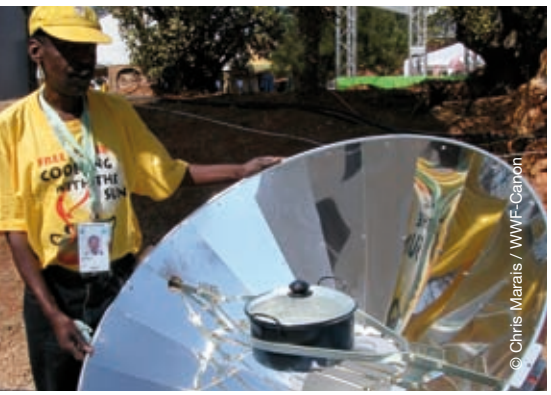
www.egsf.org.za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Kadri Nassiep, CEO, SANERI

South African National Energy Research Institute

By Kadri Nassiep, Chief Executive Officer, SANERI

The South African National Energy Research Institute (SANERI) – a state-owned subsidiary of the Central Energy Fund (Pty) Ltd was awarded the rights to host the Southern African secretariat for the Renewable Energy & Energy Efficiency Partnership (REEEP) in 2008. REEEP was formed in 2002 at the World Summit on Sustainable Development in Johannesburg as a multilateral partnership, to promote the uptake of renewable energy and energy efficiency, particularly in the developing country members' energy markets.

REEEP has successfully supported policy and regulatory studies in developing countries, where appropriate political support exists for implementation. In Southern Africa, projects have been developed in Zambia, Tanzania, Lesotho and South Africa. REEEP creates an opportunity for developing countries to fast-track deployment of renewable energy and energy efficiency through the introduction of suitable policies and measures that are developed with REEEP financial support. Priorities are established in the relevant region and the REEEP Secretariat (based in Austria) and its Governing Body is responsible for project approval and development of the strategic direction of the overall programme. For this coming year, REEEP has secured project funding of €3.7 million for distribution in the various REEEP membership regions.

The regional Secretariat is responsible for coordinating regional inputs into the strategic direction of the overall REEEP programme of work, and assists in developing a framework for projects in the region. Regional workshops and an electronic information platform called Reegle contribute to sharing of information and development of regional priorities.

There is significance in SANERI hosting REEEP. REEEP has made measurable progress in overcoming policy and regulatory barriers inhibiting the uptake of renewable energy and energy in certain developing countries. Aspects such as human capital and techno-economic studies, coupled with suitable research and development and demonstration still require attention however. This is where SANERI's activities are aimed at and provides for perfect synergy with REEEP's focus. It is expected that SANERI will be able to support the activities of REEEP in the region by supporting postgraduate studies and project development, once the appropriate policy and fiscal regime have been put in place.

A consultation process with key stakeholders in South Africa has already commenced, to be followed by broader consultations in the region. The intention is to establish what activities are still required to make REEEP's future activities more relevant and what could be done to enhance the impact of current REEEP activities in the region. This will provide for a uniquely Southern African strategy for solving what is really a uniquely Southern African dilemma.

For further information on REEEP activities in Southern Africa, please contact Amanda Luxande on +27 11 280 0465 or amandal@saneri.org.za. The REEEP website can be viewed at www.reeep.org and provides a portal to the Reegle information system (www.reegle.info).

Towards a sustainable energy future in the Western Cape

Highlights of the presentation by Mark Gordon, Western Cape Department of Environmental Affairs and Developmental Planning

The Western Cape's energy demand is approximately 249.621 GJ (2004) and this is expected to grow to 420 million GJ over the next 20 years under current growth patterns. Industry and transport are the main energy consumers and account for 80% of energy consumption. The transport sector is heavily dependent on petrol and the industrial sector, mostly reliant on electricity, is also the second largest liquid fuel consumer in the province.

The Western Cape produces 30 536 000 tonnes of CO_2 per year – half from the industrial sector and a further 22% from the transport sector. Most of the carbon dioxide released from energy use within the province comes from electricity production, with petrol and diesel use also contributing significantly. Industry is the largest user of electricity in the province, followed by the residential sector and then commerce and government.

The Provincial Government of the Western Cape has developed a Renewable Energy Strategy as part of its Climate Change Implementation Plan. The focus on renewable energy and energy efficiency is critical for mitigation against climate change and the following targets have been set:

- 15% renewable energy generation by 2014 off current base of 5000 MW
- 10% energy efficiency against business as usual by 2014
- 15% reduction of CO_2 emissions by 2014 on 2000 levels.

In order to achieve these targets, the Province has embarked on the following plan of action:

- Finalisation of a White Paper on Sustainable Energy in the Western Cape;
- Drafting of a Sustainable Energy Act;
- Roll-out of a Solar Water Heater (SWH) programme initially targeting 1 000 poor households with a plan to have this up scaled to 100 000;
- Establishment of a Solar Water Heater Training Academy in order to build up trained capacity for installation, fabrication and maintenance of SWH's;
- Setting up a Renewable Energy Sector Cluster for the Western Cape, involving industry players, government and academic institutions;
- Grid study being done in partnership with GTZ – a German government development agency;
- Completion of energy audits of all Provincial Government buildings;
- Roll-out of "greening" Provincial Government buildings to promote energy efficiency; and
- Development of a plan to provide innovative financing for Renewable Energy Projects such as Clean Development Mechanisms and Special Purpose Vehicles.

The science and state of renewable energy technologies

Synopsis of the presentation by Prof Wikus van Niekerk, Centre for Renewable and Sustainable Energy Studies (CRSES), Stellenbosch University

The scale of the global and local renewable energy resources is truly staggering: the energy from the earth's annual solar radiation is at least ten times greater than the total resource of fossil fuels and nuclear energy. The ***annual*** wind, tidal, biomass and hydro energy (all of which is ultimately a result of solar energy) exceeds the ***total*** fossil fuel and nuclear energy resource many times over.

South Africa boasts some of the most intensive solar irradiance in the world, with levels of greater than 9 000MJ/m² in the northern parts of the Northern Cape and more than 8 500MJ/m² for the entire Northern Cape and western parts of North West Province.

Solar water heaters are an established technology that saves electricity costs and is subsidised under Eskom's Demand Side Management Programme. Technologies also exist to generate solar thermal electric power using a variety of geometries, including solar dishes, troughs and towers. Solar troughs are an established technology with 420MW installed globally at the scale of 30–80MW per installation. Energy storage for 7.5 hours is available, as is the option of hybridised solar/natural gas to provide base load power. Fresnel collectors offer a cost-efficient evolution of solar troughs with the first units expected in 2010. Solar dishes can generate 25kW with plans for 500MW of capacity.

The most attractive option for South Africa is likely to be the solar tower – another proven technology (with the first plant built in the 1980s) and is currently in operation in Spain and the United States. Eskom is planning a 100MW (electric) unit northwest of Upington. With 14 hours of energy storage in molten salt, it can provide 24 hours of power in summer and a 70% load factor throughout the year. A solar tower can be built within three years.

Another newer technology is the solar chimney which collects hot air from a large covered area and generates wind power with the updraft through a central chimney (cost expectations are between 10.5 and 26.8 Euro cents per kWh).

While photovoltaic (PV) systems still have major cost and storage challenges, this technology is especially applicable to non-grid applications and is seeing massive investment growth globally.

Stellenbosch University's Centre for Renewable and Sustainable Energy Studies (CRSES) has a research "spoke" connection with the University of Pretoria on solar thermal technologies and with the Nelson Mandela Metropolitan University on solar photovoltaic technologies. Work on PV is also being done at the University of Johannesburg, University of Cape Town and University of the Western Cape. Local PV manufacturing capacity is ramping up with foreign investment.

Wind energy is seeing a more detailed quantification with future plans for multiple projects on a scale of 100MW or greater. Wave and ocean energy is also receiving more attention with the best wave energy resource situated on the south western coast.

Various universities (Stellenbosch, North West, Western Cape, and Cape Town) are investigating next-generation biomass energy. Among renewable energy technologies other than solar, wind or wave energy, large run-of-river projects like the proposed Grand Inga Project in the Democratic Republic of the Congo can deliver cost effective renewable energy on a large-scale. Another attractive option is biogas digesters which turn bio-waste into clean cooking or heating fuels and other waste-to-energy projects, including landfill gas.

South Africa has significant, even world-leading, solar, wind and ocean energy resources. It has expertise in these fields and a history of funding cutting-edge energy projects (like Coal-to-Liquid and the Pebble-Bed Modular Nuclear Reactor). With leadership, it could turn this comparative advantage into a competitive advantage.

Possible challenges to the implementation of Cabinet's directions related to renewables

Highlights of the presentation by Peter Lukey, Chief Director of Climate Change and Air Quality Management (DEAT)

Lukey gave a brief report on the Cabinet response to the Long-Term Mitigation Scenarios (the statement of July 28 is available at www.deat.gov.za), before reflecting, in his personal capacity, on the history of advocating renewable energy in South Africa and how this has finally become a mainstream activity with participation of some of the largest corporate players.

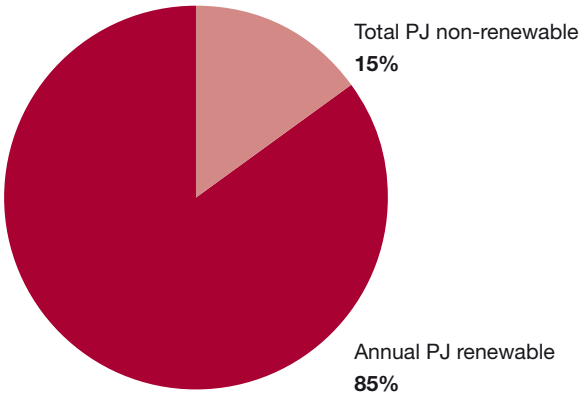
"If the total coal reserve of 1 298 000 PJ is used up in 200 years, as is often suggested, the total solar reserve potential over 200 years amounts to a staggering 1 700 000 000 PJ; our coal reserves are a measly *0.07% of our solar potential* over 200 years."

Cabinet's response to climate change mitigation opportunities includes:

A policy vision to achieve:

- The socioeconomic transition: The transition to climate-resilient and low-carbon economy and society will:
  - balance our mitigation and adaptation response;
  - in the long term, redefine our competitive advantage and structurally transform the economy by shifting from an energy-intensive to a climate-friendly path as part of a pro-growth, pro-development and pro-jobs strategy.
- GHG emissions must peak, plateau and decline – stop growing at the latest by 2020–2025, stabilise for up to ten years[1], then decline in absolute terms.
- The renewable energy sector is identified as a key "business unusual" growth sector and policies and measures are to be put in place to meet a more ambitious national target for renewable energy.
- Treasury will study a carbon tax in the range modelled by the LTMS, starting at low levels soon and escalating to higher levels by 2018/ 2020.
- There is increased support for the new and ambitious research and development targets that are being set, especially in the field of carbon-friendly technologies, with the focus on the renewable energy and transport sectors.
- Our immediate mitigation tasks include:
  - ***Start Now*** based on accelerated energy efficiency and conservation across all sectors (industry, commerce, transport and residential, including more stringent building standards);
  - investing in ***Reach for the Goal*** by setting ambitious research and development targets focusing on carbon-friendly technologies, identifying new resources and affecting behavioural change; and
  - combining regulatory mechanisms under ***Scale Up*** and economic instruments (taxes and incentives) under ***Use the Market*** with a view to (*inter alia*):
    - mandatory energy efficiency targets;
    - increasing the price on carbon through an escalating CO_2 tax, or alternative market mechanism;
    - diversifying the energy mix and laying the basis for a net zero-carbon electricity sector in the long term;
    - setting similar targets for electricity generated from both renewable and nuclear energy sources by the end of the next two decades;
    - incentivising renewable energy through feed-in tariffs; and
    - facilitating passenger modal shifts towards public transport and the aggressive promotion of hybrids and electric vehicles.

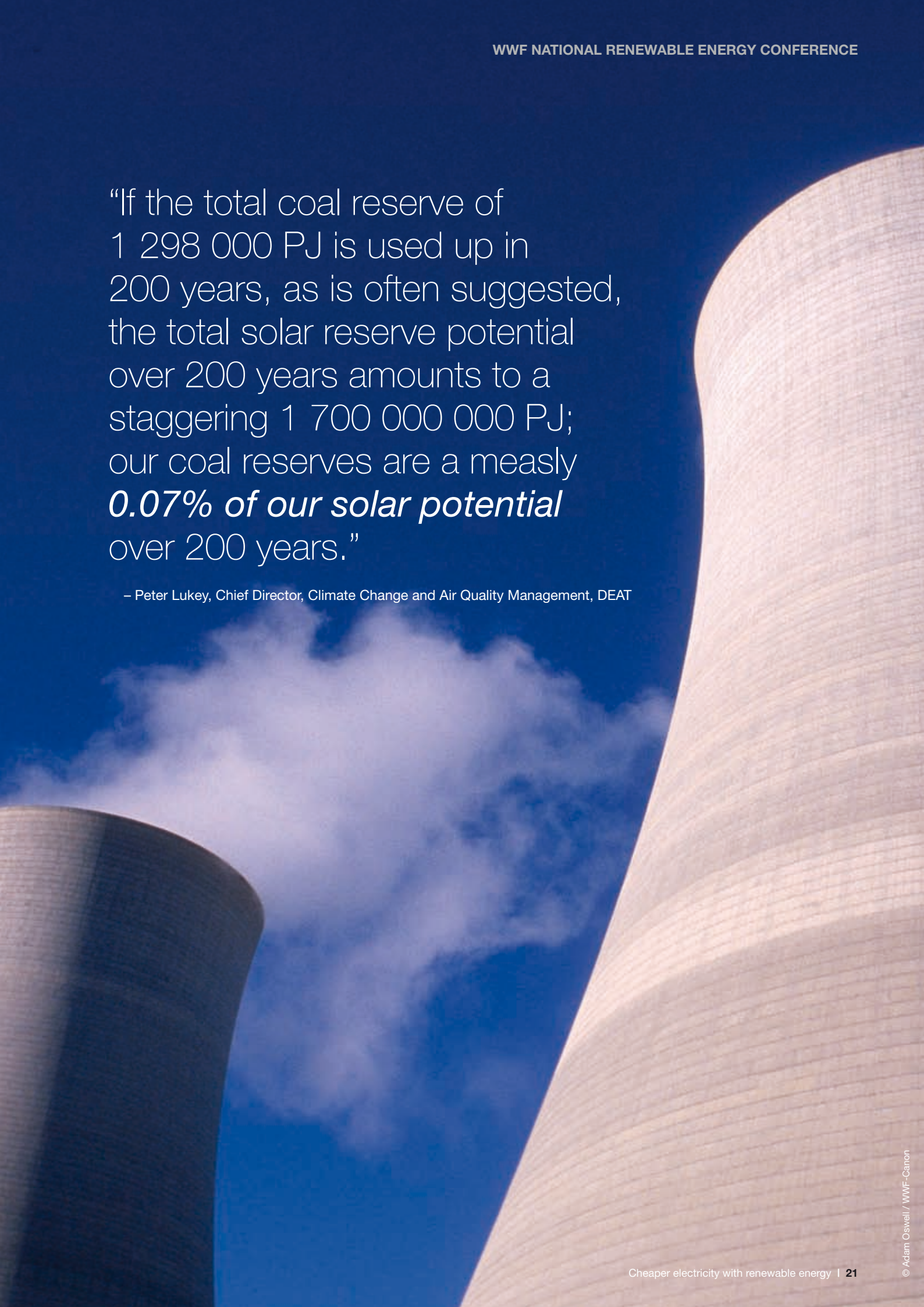
Energy reserves



The introduction to Lukey's personal reflections has been translated into the myths that participants have resolved to debunk (see page 23). He elaborated on the common statement that because South Africa has coal, we are impelled to use it, pointing out that the total non-renewable resources in South Africa are but 15% of the annual renewable energy resources available.

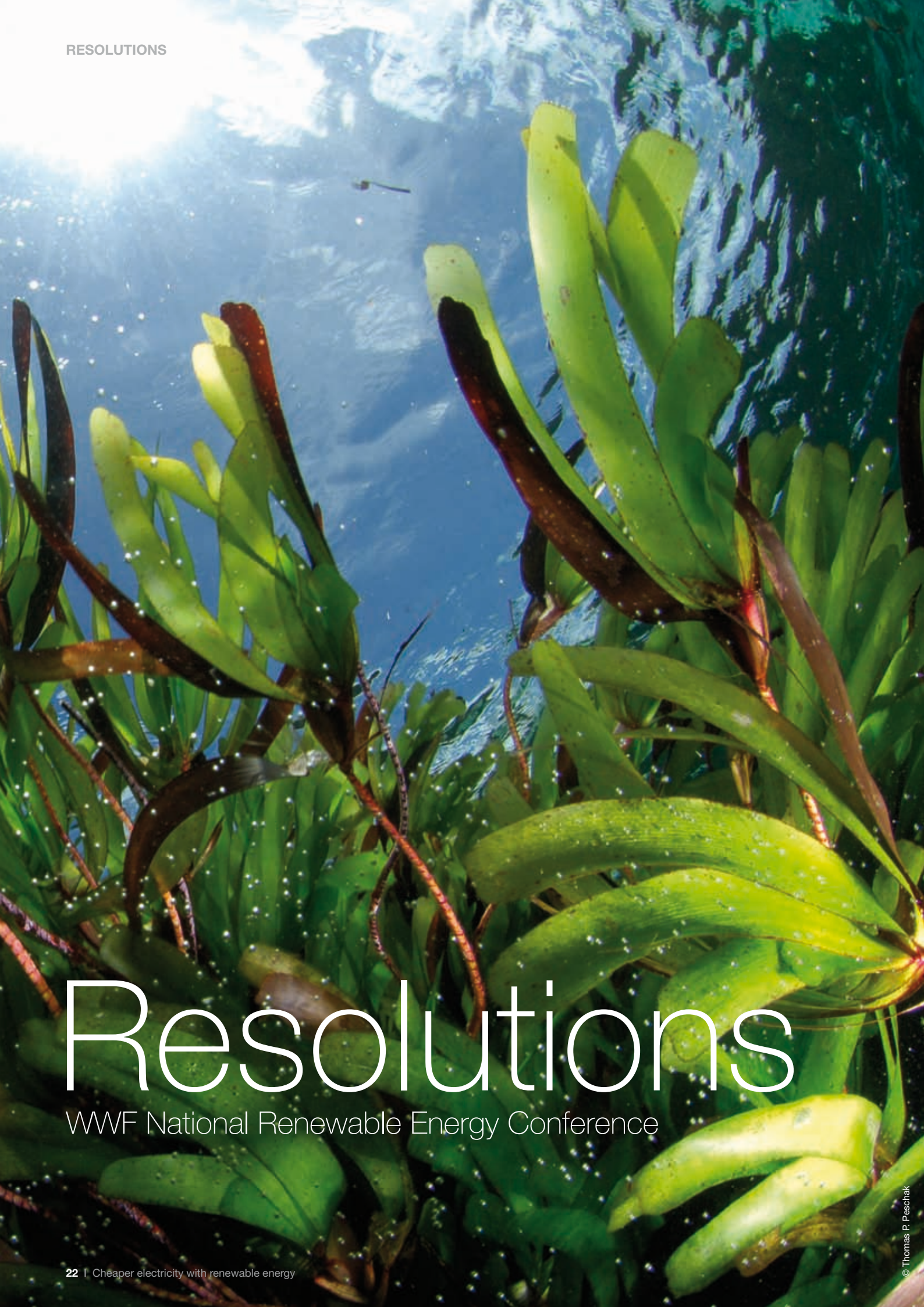
Lukey noted that the ISES Solar World Congress 2009 will be held at the Sandton Convention Centre 11 – 14 October 2009.

1 *At an international presentation during climate negotiations in Poland in December 2008 it was noted that emissions should plateau at about 550MtCO_2equivalent, assuming the international support promised at the previous years negotiations in Bali.*



"If the total coal reserve of 1 298 000 PJ is used up in 200 years, as is often suggested, the total solar reserve potential over 200 years amounts to a staggering 1 700 000 000 PJ; our coal reserves are a measly ***0.07% of our solar potential*** over 200 years."

– Peter Lukey, Chief Director, Climate Change and Air Quality Management, DEAT



Resolutions

WWF National Renewable Energy Conference

The conference participants recognise:

- scientific findings that the atmospheric concentration of CO_2 needs to be reduced to keep global warming below two degrees Celsius;
- that it is therefore necessary to optimise renewable energy use and reduce reliance on fossil fuels as a matter of urgency;
- the human right to basic energy services, which requires universal access for every household in South Africa to clean, task-appropriate energy, including for cooking (e.g. sustainable bio-char, solar cookers), heating (e.g. solar water heating) and electricity (e.g. photovoltaics for off-grid areas);
- the enormous contribution renewable energy can make to social welfare, including scaled up employment, improved access to energy services, public health, and sustainable economic growth and development;
- that South Africa should become a world leader in renewable energy technologies, particularly solar thermal energies;
- National Energy Regulator of South Africa's (NERSA) very welcome commitment to put in place a feed-in tariff for renewable energy electricity generation by 28 Feb 2009, with a "cost plus return" approach to tariffs;
- consistency of the above and the following objectives with existing policy and legislation, including the White Paper on Energy Policy 1998.

The conference participants resolve to dispel the following myths:

- "Renewable energy technology is not yet mature enough to provide significant amounts of electricity to the grid"
- "There is not enough renewable energy to meet our current, let alone future, energy needs"
- "Renewable energy cannot provide base-load power"
- "Renewable energy is too expensive"
- "Renewable energy will make electricity unaffordable for the poor"
- "Renewable energy is a hippy hobby"

Such notions, still prevalent amongst some decision-makers and peddled by some "independent experts", are amongst the greatest barriers to realising the public benefits available through optimal utilisation of South Africa's abundant renewable resources.

It is necessary to optimise renewable energy use and reduce reliance on fossil fuels as a matter of urgency.

The conference participants resolve to work for the achievement of the following:

1. Adoption of a national target of at least 15% of electricity generation from new renewable resources by 2020;

2. Adoption of a national target of at least one million domestic solar water heaters installed by 2013 and four million installed by 2020;

3. Immediate implementation of the levy on non-renewable electricity by the Minister of Finance and commitment to scaling up carbon tax for all non-renewable energy;

4. Concentrating Solar (Thermal) Power (CSP) initiatives to be made an autonomous national flagship project;

5. The Department of Trade and Industry to incorporate a renewable energy support programme within its Industrial and Sector Strategies to ensure the development of local industries in renewable energy technologies and Treasury to provide incentives for implementation;

6. The establishment of a distinct Department of Energy, separate from Minerals, with a commitment by government to resolve the existing institutional and governance fragmentation in the energy sector and to resume integrated energy planning[1];

7. Adequate tariffs for various electricity generation technologies under NERSA's feed-in tariff system for renewable energy electricity generation, to be in place by 28 February 2009, as part of a suite of support mechanisms;

8. Acknowledgement of the valuable efforts of parliamentarians in tabling a Private Members Bill on Feed-In Tariffs;

9. Coherent and coordinated input to further work on the NERSA feed-in tariff proposal; WWF will endeavour to facilitate a technical working group to develop input to NERSA public participation processes;

10. Review of support mechanisms for scaling up deployment of solar water heating (SWH) systems, seeking to avoid increased up-front costs (including transaction/subsidy management costs) of installation and to achieve optimal job creation and electricity demand reduction;

11. Increasing the capacity of SABS to ensure timely testing and certification of solar water heating systems, supported by public finance (through DTI or DST) and possibly including outsourcing;

12. Innovative financing options for SWH, such as tax rebates, accelerated depreciation and/or development of 'water heating utility' services;

13. Legislation requiring the inclusion of SWH in all new, including replacement, water heating systems, where physically feasible;

14. Development of a National Biomass Energy Strategy to ensure that biomass for energy does not compromise food security or biodiversity, and to include energy production from biomass waste, such as domestic organic matter, agricultural waste and sewage, including biogas digesters at small and large scale;

15. That localised, grassroots initiatives and the use of waste materials (excluding toxic or hazardous wastes) be prioritised in the utilisation of biomass for energy and supportive legislation (to encourage innovation and investment);

16. Working for Energy[2] to be incorporated into national energy development planning and in particular into the work programme of the South African Energy Development Institute (SANEDI), from its inception, with dedicated capacity to ensure implementation and a fast track training programme to allow ramping up within two years, similar to the 1995 National Electrification Programme;

17. Working for Energy incorporated into the National Climate Change Response Policy as a Sustainable Development Policy eligible for international financial support, and point persons identified in relevant departments at all levels of government to ensure implementation;

18. Development of indicators of Working for Energy implementation, including energy services delivered, employment generated and measurable, reportable and verifiable greenhouse gas emissions avoided (these not a precondition for initiation of the programme);

19. Better provision of public interest information in the energy sector, in a transparent manner and supported by a national 'clearing house';

20. Consolidated energy resource assessments to be made publicly available (including to Independent Power Producers) and developed at higher resolution;

21. Coordinated and coherent planning of grid management and expansion, with full transparency;

22. Compilation/consolidation of a coherent and comprehensive South African business case for renewable energy, incorporating *inter alia* the South African Wind Energy Programme, the Working For Energy initiative and latest research, including the UCT study on costing a 15% electricity target commissioned by WWF;

23. Development of opportunities to access multilateral and bilateral funds, and/or bridging finance, including the measurable, reportable and verifiable (MRV) support promised by developed countries (as listed in UNFCCC Annex 1) for developing country mitigation action, such as for accelerated utilisation of renewable energy under a Sustainable Development Policies and Measures (SD-PAM) package;

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1 One participant felt that such institutional change might delay progress

2 A 'Working for Energy' programme overview is included, see page 27; full details available: gpreston@mweb.co.za

24. A more effective and inclusive renewable/sustainable energy industry body, providing more coherent leadership and coordinated engagement with authorities and financial institutions, including to address regulatory barriers and develop opportunities for market expansion etc;

25. Increased public investment in the research and development of innovative renewable energy technologies.

The conference participants further support the formation of a Renewable Energy Task Force, with a limited life-span of about six months, to drive and coordinate work for the achievement of the above objectives.

The WWF Living Planet Unit undertakes to host the first meeting of the team, as early as possible in 2009, with participation of business and industry bodies. The team will, *inter alia*, take the conference outcomes into the process to review the national renewable energy target and white paper (a DME Summit is anticipated) and take responsibility for producing, publicising and disseminating the 'national business case' for renewable energy in advance of the National Climate Change Response Policy Summit, being convened by DEAT 3 – 6 March 2009.

All interested parties are encouraged to immediately make use of these resolutions in their own lobbying and advocacy work.

South Africa should become a world leader in renewable energy technologies, particularly solar thermal energies.

WORKING FOR ENERGY

The ***Working for Energy*** programme has been proposed to be coordinated by the Department of Minerals and Energy, in partnership with the Departments of Public Works, Water Affairs and Forestry; Environmental Affairs and Tourism, and Agriculture.

There are two components to the programme: supply-side management and demand-side management:

A. Supply-side Management

The focus will be on labour-intensive and broad-based black economic empowerment approaches to the supply of additional energy, with specific reference to the following:

1. Biomass from invasive alien plants and bush encroachment.
2. Biogas generation from farm waste.
3. Biogas generation from municipal solid waste.
4. Biogas generation from municipal waste water.
5. Biogas from household waste.
6. Provision of solar-heated water.
7. Repair of roads for the supply of coal to power stations.
8. Run-of-river generation of electricity.

B. Demand-side Management

In addition, labour-intensive options will be pursued for the management of the demand for electricity (and linking to other forms of energy), as well as combining with water audits in terms of (1):

1. Audits, retrofits, incentives and advocacy.
2. Thermal performance enhancement: Installation of ceilings (in the houses of the poor).

In addition, budget for Clean Development Mechanism financing is sought.

Civil society, organisations and institutions represented at the conference

A.B.I; ABSA; ABSA CAPITAL; AFRICAN ALT. ENERGY; AFRICAN CENTRE FOR TECHNOLOGIES; AGAMA ENERGY; ALTE TECHNOLOGIES; AMANZI BUBOMI DEVELOPMENTS; ATLANTIS CORPORATE TRAVEL; AURORA POWER SOLUTIONS; BARLOWORLD; BIO2WATT; BUILDERS WAREHOUSE; CADCOM ENERGY SOLUTIONS; CENTRE FOR RENEWABLE STUDIES; CHI DESIGN STUDIO; COCA ZOYA WASTE; CONTIGAS; COSATU; COSMOS PRODUCTIONS; CREAMER MEDIA; CSIR; CULLINAN ENERGY SOLUTIONS; DBSA; DE BEERS; DIFFERENTIATED BUSINESS SOLUTIONS; ECOLAND; ECOR CLEANING; ECO TRUST/CURES; EMVELO; ENGINEERING NEWS; ENVIDEV; ENVIRONMENTAL WASTE SOLUTIONS; ENVIROSERVE WASTE MANAGEMENT; ESKOM; ESKOM ENERGY SERVICES; ESSGA; EXXARO RESOURCES; FINANCIAL & FISCAL COMM; FIRST RAND; FLO EV; GLOBAL AFRICA NETWORK (TradeInvestSA); GROUP FIVE; GTZProBEC; HATCH South Africa; HEINRICH BOLL STIFTUNG; HSBC; INDEPENDENT DEMOCRATS; INDEPENDENT RESEARCHER; INJIYA YA URI; INSPIRED EVOLUTION MANAGEMENT (Pty) LTD; INSTITUTE FOR DEMOCRACY IN SA; INSTITUTE FOR GLOBAL DIALOGUE; JOSEPHINE MILL; KAYEMA; LONMIN; MAC CONSULTING; MAKE SUSTAINABLE DEVELOPMENT A REALITY; MEETI; MEROPA COMM; METALLUX SA (Pty) LTD; METRO BUS; MGWALI ENERGY; MILLSTREAM COUNTRY ESTATES; MISSION ENVIRONMENTAL PRODUCTS; MONTANA; NANO ENERGY; NATIONAL BUSINESS INIT.; NATIONWIDE ENERGY; NEDBANK; NEDBANK CAPITAL; NERSA; NMMU; OLD MUTUAL INVESTMENT CORP; OXFAM UK; PEOPLES POWER AFRICA; PEOPLES POWER AFRICA (TWIG); PHAMBILI ENERGY; PHUMELO GROUP; PRISM; PRISM ENERGY VENTURES; PROJECT90X2030; PROMETHIUM CARBON; RESOURCE AFRICA; SAFCEI; SANERI; SAPPI; SASOL; SEA (SASOL); SELF EMPOWERMENT & DEVELOPMENT; SEMPER DEVELOPMENT SERVICES – ALTERNATE ENERGY; SOUTHERN AFRICAN BIOFUELS ASSOCIATION; SOUTHERN AFRICAN FAITH COMMUNITIES ENVIRONMENT INSTITUTE; STANDARD BANK; STELLENBOSCH UNIVERSITY; SUNFIRE INTERNATIONAL; SUNFIRE SOLUTIONS; SUSTAINABLE ENERGY SOCIETY OF SA; SUSTAINABLE ENERGY AFRICA; SYNERGETICS; SYNTHESUS CONSULTING; SYRINGA INSTITUTE; TETRA PAK; TSWELA PELO TECHNOLOGY; UMNOTHO INTEGRATED ENERGY; UNIVERSITY OF CAPE TOWN; UNIVERSITY OF JHB; UNIVERSITY OF KZN – SCHOOL OF PHYSICS; UNIVERSITY OF PRETORIA; UNLIMITED ENERGY; UNYAZI SOLAR SOLUTIONS FOR AFRICA; VEOLIA WATER; VUTHELA RESOURCES; WORKING FOR WATER PROGRAMME; WWF STAFF, INCLUDING ONE MEMBER FROM SOUTHERN AFRICAN REGIONAL PROGRAMME OFFICE & WWF TRUSTEES; YAZI-NDALA TRADING; ZITELO DEVELOPMENT CONSULTING; ZM SA.

Officials from local, provincial and national government participated, but are not authorised to endorse resolutions on behalf of government.

The WWF Living Planet Unit

The world is tasked with a new challenge: to respond effectively to the impact of human activities (and in particular the impact of economic activities such as resource extraction, production and consumption) on the health of the environment. Since 2006, WWF has broadened its sphere of activities, from an almost exclusive focus on biodiversity conservation, to include the area of environmental sustainability. As a result, WWF and all its affiliate organisations across the globe focus on the achievement of two meta-goals, namely that:

- **By 2050, the integrity of the most outstanding natural places on earth is conserved, contributing to a more secure and sustainable future for all**

- **By 2050, humanity's global footprint stays within the earth's capacity to sustain life and the natural resources of our planet are shared equitably.**

To deliver on the second meta-goal in particular, WWF South Africa has created a Living Planet Unit which focuses on the promotion of environmental sustainability and the reduction of the environmental footprint of society and the economy in South Africa.

Staffed by professionals from diverse backgrounds, the Living Planet Unit develops and promotes research, advocacy and communication on scientific and economic approaches to sustainability.

The objectives of the Living Planet Unit are defined as follows:

- By 2012, South Africa, through **cooperation between government, the private sector and civil society**, has:
  - set a trajectory for decarbonising **electricity supply**
  - set a trajectory for decarbonising **transport**
  - implemented a market mechanism to address the externality/social **cost of carbon**
  - played a leading role in building multi-lateral consensus on an equitable and effective **Global Climate Deal**
  - recognised the potential of **Environmental Goods and Services** as a sector in which South Africa can exhibit leadership amongst emerging economies
  - collaborated with both developed and developing nations in restructuring the global financial architecture in a manner that addresses **peoples' right to development** in a post-carbon world
  - played a leading role in the facilitation of a global agreement on **financing for climate adaptation**

- By 2020, South Africa has achieved the economic transformation required to take it from a laggard to **a world leader in the 'post-carbon' global economy**

In order to achieve these objectives, the Living Planet Unit has been organised to focus on three distinct spheres of activity:

- **Business and Industry** activities focus on the promotion of sustainability within the corporate sector, particularly WWF South Africa's corporate members, through the application of appropriate sustainability strategies and reporting, standards and corporate social investment.

- **The Climate Change Programme** is responsible for promoting an effective South African response to the climate crisis, in the context of both domestic policy development and in terms of the leading role being played by South Africa in global climate negotiations. Our top priority is for an equitable multilateral agreement to enter into force post-2012.

- **The Trade and Investment Programme (TIP)** operates in the BRICS group of key emerging markets (Brazil, Russia, India, China and South Africa), and is managed from South Africa – the only international WWF programme managed from a developing country. TIP focuses on the impact of trade and investment flows to, from and between these emerging markets, and on environmental sustainability, both within these markets and in their trade and investment partners. A major focus of the Programme is the promotion of leadership in the development of environmentally beneficial technologies, products and services within the BRICS countries.

Promoting transformation to low-carbon development

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