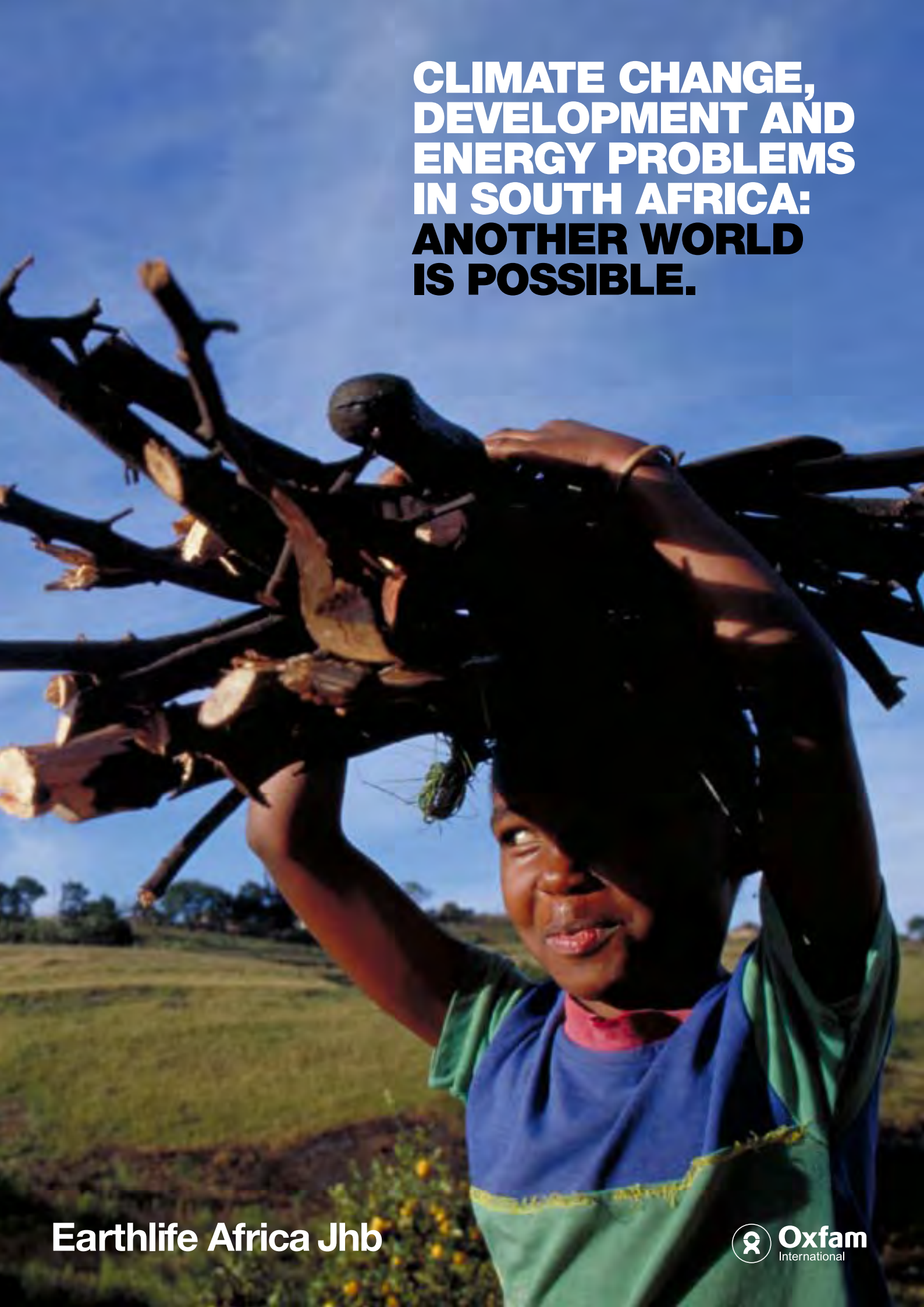


CLIMATE CHANGE, DEVELOPMENT AND ENERGY PROBLEMS IN SOUTH AFRICA: ANOTHER WORLD IS POSSIBLE.

Earthlife Africa Jhb

Oxfam International

CONTENTS

ABBREVIATIONS

Asgisa	Accelerated and Shared Growth Initiative for South Africa
BCLMP	Benguela Current Large Marine Ecosystem Programme
CDM	Clean Development Mechanism
CDP	Carbon Disclosure Project
CO_2	Carbon Dioxide
CTL	Coal to Liquid
DEAT	Department of Environmental Affairs and Tourism
GDP	Gross Domestic Product
GEAR	Growth, Employment and Redistribution Strategy
GHG	Greenhouse gases
GWC	Growth Without Constraints
GWh	Gigawatt hour
HLG	High Level Group
IPCC	Intergovernmental Panel on Climate Change
JSE	Johannesburg Securities Exchange
KWh	Kilowatt hour
LTMS	Long Term Mitigation Scenarios
NCCS	National Climate Change Strategy
NEMA	National Environmental Management Act
NGO	Non-governmental Organisation
OCGT	Open-Cycle Gas Turbines
RBS	Required By Science
RDP	Reconstruction and Development Programme
TAC	Treatment Action Campaign
UNFCCC	United Nations Framework Convention on Climate Change

FOREWORD

The scientific verdict is in; our planet is heating up and human activity is the cause. We already see indications of a dire future, with the Arctic ice sheet melting at rates faster than scientists predicted, and methane already bubbling up from the ocean floor. In South Africa, we already see changes in species distribution patterns, and indications of changes to wind and rainfall patterns. Respected scientists such as Dr. James Hansen[1] warn that the point of no return is almost upon us — the point at which Earth experiences runaway climate change — and we will be powerless to prevent it. What happens then?

This report is sobering reading. It outlines the impacts that can be expected of climate change to both natural environments and human populations. While we still don't know what the localised impacts will be, for example exactly what rainfall changes to expect in Colesberg or Tzaneen, we do have a good sense of the broader general trends. This report charts those trends: South Africa will become hotter and drier over the interior, agricultural productivity and production patterns will change, and we will see species loss in many areas, including large protected areas such as the Kruger National Park. The impacts to health are frightening. Not only will we face a future with less available water (with consequences for hygiene and health) but many disease-causing organisms, such as malaria-carrying mosquitoes and water-borne pathogens, are likely to expand their territories and further impact on human well-being.

We know that climate change will impact negatively on already stressed natural systems. Over the last century, South Africa's environment has been systemically degraded, with specific and severe impacts in Apartheid's homeland and township areas. Forced resettlements resulted in localised overpopulation, with too many people relying on too few resources, and urban townships in Johannesburg were placed downwind of toxic mine dumps. These areas remain immersed in deep poverty and inequality to this day.

The poor of South Africa have endured a century of environmental pollution, from industrial poisoning of the air and groundwater in the Vaal Triangle and Durban South, to diminishing livelihoods in Craigieburn and Bodibe.

As South Africa's climate changes because of rising global emissions of greenhouse gases, the worst effects will be in such already degraded local environments. It is South Africa's poor, the majority of the population, who will be the hardest hit. On the contrary, South Africa's white population, and the rising black elite and middle class in the years since democracy, have largely been able to live in pleasant environments and escape from industrial pollution and they are less vulnerable to climatic shocks.

With 30% of households currently without access to electricity, any response to climate change will have to take into account the effect of rising energy costs on poor households. Some immediate adaptation steps would be to significantly increase Free Basic Electricity, start constructing low-income housing in an energy efficient manner, promote urban gardening, and institute a Basic Income Grant.

The Department of Environmental Affairs and Tourism (DEAT) has the responsibility for not only—somehow—reducing South Africa's greenhouse gas emissions, but also continuing to play a major leadership role in persuading the rest of the world to cut emissions, and protecting South Africans from current environmental destruction. It is impossible not to empathise with DEAT's officials. This is a massive task with a very tight deadline; the current thinking is that global emissions must

peak (reach their highest point) no later than 2015. Six years to go and it seems the world is still fiddling with insignificant actions. If it weren't so tragic, it would be a farce.

As this report points out, government's task is all the more challenging because of the structure of South Africa's economy. South Africa's emissions are not the result of people flying too much or boiling too many cups of tea. Rather, it is mainly because of our energy production processes, with two companies accounting for the bulk of our emissions: Sasol and Eskom. Both produce mind-boggling volumes of greenhouse gases, Eskom from its coal-fired power stations and Sasol from its coal and natural gas to liquid fuels processes. This report contends that neither company has meaningful plans to change their output, but change they must; both companies are punting vague and hyper-theoretical carbon capture and storage plans. This report exposes the true nature of the plans for carbon capture and storage, the grand super technological fix for climate change, as a mere pipe dream. Carbon capture and storage is, at best, merely a theoretical potential solution, with decades of experimenting required before it can become a reality.

The reality is that we don't have decades. We have six years.

Should we as citizens submissively wait for the captains of industry to altruistically – and drastically - change their business models, for Sasol to start building electric cars and for Eskom to invest in windmills and solar panels? No. Because they won't. A year and a half ago, an official from DEAT stood up before a group of environmentalists and NGO representatives and said, *"Where is the environmental movement? Where are the placards? We can't change things without the pressure of citizens."*

The official's comments were spot on; South African environmental organisations have not successfully stimulated popular resistance to ecological destruction, which is a necessary condition for change.

The South African government and the international community will reduce emissions; business will halt its unscrupulous practices; plans will be put into place to protect marginalised communities from impacts on their ability to live in health and well-being - but only if we, the citizens of this world, demand it. Together, in our hundreds, thousands and millions, we have the power to force change, to force the transition to a low-carbon economy.

The time to agitate, educate and organise is now. At the UN Climate conference in Copenhagen at the end of 2009, the governments of the world will get together to decide our collective fate; they have this one chance. Perhaps we should remind them just exactly whom they are working for.

Tristen Taylor
Energy Policy Officer,
Earthlife Africa, Johannesburg
February 2009

1 Hansen, J. Global Warming 20 Years Later: Tipping Points Near www.columbia.edu/~jeh1/2008/TwentyYearsLater_20080623.pdf

EXECUTIVE SUMMARY

In climate terms, South Africa is already living on the edge. Much of it is arid or semi-arid and the whole country is subject to droughts and floods. Even small variations in rainfall or temperatures would exacerbate this already stressed environment. Most South African crops are grown in areas that are only just climatically suitable and with limited water supplies.

But that climate is set to change for the worse because of rising global emissions of greenhouse gases (GHGs). Indeed, there are already ominous signs of change – that dry seasons are becoming longer and wet seasons starting later. Rainfall is reported to be becoming even more variable, with rain coming in more concentrated, violent bursts.

When the Government of South Africa used internationally agreed scientific computer models to explore the potential impacts of climate change on South Africa over the next 50 years, it predicted:

- A continental warming of between 1 and 3 deg C.
- Broad reductions of approximately 5 – 10 % of current rainfall, but with higher rainfall in the east and drier conditions in the west of South Africa.
- Increased summer rainfall in the northeast and the southwest, but a reduction of the duration of the summer rains in the northeast, and an overall reduction of rainfall in the southwest of South Africa.
- Increased rainfall in the northeast of the country during the winter season.
- Increased daily maximum temperatures in summer and autumn in the western half of the country.
- Wetter conditions with a reduction in frost, which could see malaria mosquitoes expand their range onto the Highveld.

As the climate changes, it is South Africa's poor, the majority of the population, who will be the hardest hit. Climate change worsens existing vulnerabilities and adds to the pressures on the environment and natural resources on which so many South Africans directly rely. Climate change could increase the prevalence and distribution of vector-borne diseases such as malaria and dengue fever and water-borne diseases such as choleraand dysentery. Such things mean that people living with HIV and AIDS in particular would experience increased risks.

South Africa has been playing an influential role as a developing country in the international negotiations even though it is not yet obliged to make commitments to reduce emissions. But South Africa is also part of the problem - the largest emitter of green house gases on the African continent and home to the world's biggest single emitter of CO_2.

Although it is not (yet) under any legal obligation, South Africa has a moral obligation to reduce its emissions, which would also send a powerful political message to the world and increase the strength of its negotiating position in global climate change talks and its leverage in demanding emissions cuts from rich countries.

South Africa is faced with a difficult challenge in trying to juggle three imperatives – development (conventionally based on fossil fuels), poverty eradication and climate change. On the one hand, the country has to fast track provision of adequate transport, power, communica¬tion networks, water, sanitation and other infrastructure services. Much of this development implies that South Africa's GHG emissions will increase. The provision of these services is essential to improving people's well being and to reducing poverty.

On the other hand, conventional development as carried out in South Africa (like many other countries) has not focused on reducing poverty, will not reduce it by itself, and may sometimes exacerbate poverty and ill-health. And now South

Sasol refinery, Picture credit: Bobby Peek, groundWork

Africa also has to respond to the impacts of climate change by reducing emissions and carrying out programmes to help poor people adapt to the changing climate.

Energy production is a particular concern. South Africa's dependency on coal-fired power stations has already resulted in a yearly per capita emission rate of about 10 tons of carbon dioxide, 43 percent higher than the global average. At the same time, this extremely high per capita energy use has not meant that everyone in South Africa has access to energy; 30% of South African citizens do not have access to electricity.

South Africa has benefited from an abundant and cheap supply of electricity since the founding of the monopoly public utility, the Electricity Supply Commission (later renamed Eskom) in 1928. Eskom in effect subsidized South Africa's industrial development and is responsible for supplying 95% of the country's electricity – 90% of which comes from coal-fired power stations. Eskom accounts for about half of South Africa's total emissions.

Eskom predicts that with electricity supply growing at a potential 4.4% per annum CO_2 emissions from electricity generation would more than double over the next 20 years. Eskom's publicity makes much of its wind farm in the Western Cape, but the contribution of renewable energy to its plans is negligible, adding a mere 100MW (0.25% of current national generating capacity). Eskom's solar water heater programme, which aims to replace 900,000 solar water heaters over five years, managed to install a mere 800 heaters nationally in 2008.

Sasol is a Coal-to-liquids (CTL) company established under Apartheid as a way of securing white South Africa's independence on foreign oil. The company is responsible for producing almost 72 million tons of CO_2 a year and its Secunda CTL plant is the biggest single emitter of CO_2 on the planet. Given these figures, it is in the company's business interest to reduce its emissions as climate change debates take centre stage in the lead up to the Copenhagen climate change conference at the end of 2009. But Sasol's planned response relies heavily on the unproven technology of carbon dioxide capture and storage, and it has announced plans to construct a new 80,000 barrels per day CTL plant in Limpopo. The Government has given the new CTL plant its blessing, even though another CTL plant will increase the country's CO_2 emissions even further, and would make a mockery of the aims of the government's climate change mitigation plans.

What needs to happen?

To address climate change, the current energy system must be overhauled. South Africa is officially committed to a 15% renewable energy target by 2020 but progress on the ground is painfully slow.

The current financial crisis should provide an opportunity for all societies to shift to a low carbon economy. The global slow-down is causing job losses and hardship to many, but equally, climate change means that it would be reckless to try to go back to fossil fuel based development pathways that will anyway have to be abandoned soon. This is an opportunity to redevelop economies and create a new industrial revolution that develops and is powered by clean energy technologies. Doing so will create new jobs and a secure future for all. We calculate that a realistic programme to promote renewables in electricity, biogas, solar heating and biofuels could produce an extra 1.2 million jobs, direct and indirect, by 2020. Clean energies also hold out much greater hope that communities that lack electricity from the central grid and who struggle to find fuel for cooking will see their energy needs met.

However, getting the policy framework right is critical if we are to realise this potential. With the right framework, both the private sector and new community enterprises will take off and rapidly become a big part of the solution to South Africa's power shortage. The National Energy Regulator (NERSA) is to be congratulated for considering a Feed in Tariff scheme to support renewable energy – a tried and tested policy tool. This tariff must be set at the correct levels to stimulate investment. The tariffs should be set to provide reasonable returns for efficient renewable energy operations but not so high that the boom penalises poor consumers. Measures such as carbon taxes should also be considered.

In moving forward, government has to take responsibility for the inaction of industry. Yes, it has developed policies on climate change, but these policies must be accompanied by implementable plans and actions and more importantly a visible change in government policy to hold industry accountable.

In addition, poor and vulnerable communities in South Africa need the right help to adapt to the unavoidable consequences of climate change. Even if all emissions are stopped now the cumulative impact of existing emissions will still be felt for decades to come. People are developing their own mechanisms to adapt, but more assistance is needed from government. Communities facing rising temperatures, with associated stress on water supplies, crops and animals need the right policies put in place straight away. Those policies must uphold the principles of economic, social and environmental justice; the economy must serve the needs of people.

To simultaneously embark on the path to a future that provides cleaner energy to all citizens equitably and effectively, the following measures should be given immediate attention:

1 A moratorium on building further coal-fired plants after Medupi and Bravo (i.e. from 2013).
2 An immediate moratorium on any new coal-to-liquid plants.
3 The Treasury should institute its fossil fuel levy (ZAR0.02/kWh) with immediate effect, revenue from this to be ring-fenced for Free Basic Electricity.
4 A staggered implementation of carbon taxation.
5 The provision of 1 million solar water heaters by 2020.
6 15% of all electricity to come from renewable energy by 2020, and 50% by 2050.
7 Make energy efficiency in Reconstruction and Development Programme (RDP) housing a mandatory measure by 2015.
8 Invest in an efficient public transport system.
9 Promote gardening in urban and peri-urban areas and around homesteads.
10 Increase public awareness and promote behavioural change among consumers.

A year and a half ago, an official from the Department of Environmental Affairs and Tourism (DEAT) stood up before a group of environmentalists and NGO representatives and pleaded, *"Where is the environmental movement? Where are the placards? We can't change things without the pressure of citizens."* The time to agitate, educate and organise is now. At the end of 2009, the governments of the world will meet to decide our collective fate at the UN climate change conference at Copenhagen; they have this one chance. Perhaps we should remind them just exactly who they are working for.

INTRODUCTION

"In the world we live in, the bad wolf of climate change has already ransacked the straw house and the house made of sticks, and the inhabitants of both are now knocking on the door of the brick house where the people of the developed world live"

Emeritus Archbishop Desmond Tutu.

Oxfam International commissioned this report, written by Earthlife Africa Johannesburg, with Oxfam contributions, to explore climate change impacts on South Africa and the South African government's response to climate change. In particular, the report is concerned with understanding government's focus in terms of various imperatives - pro-growth, pro-economic development and pro-jobs – and pro-poor policies or actions.

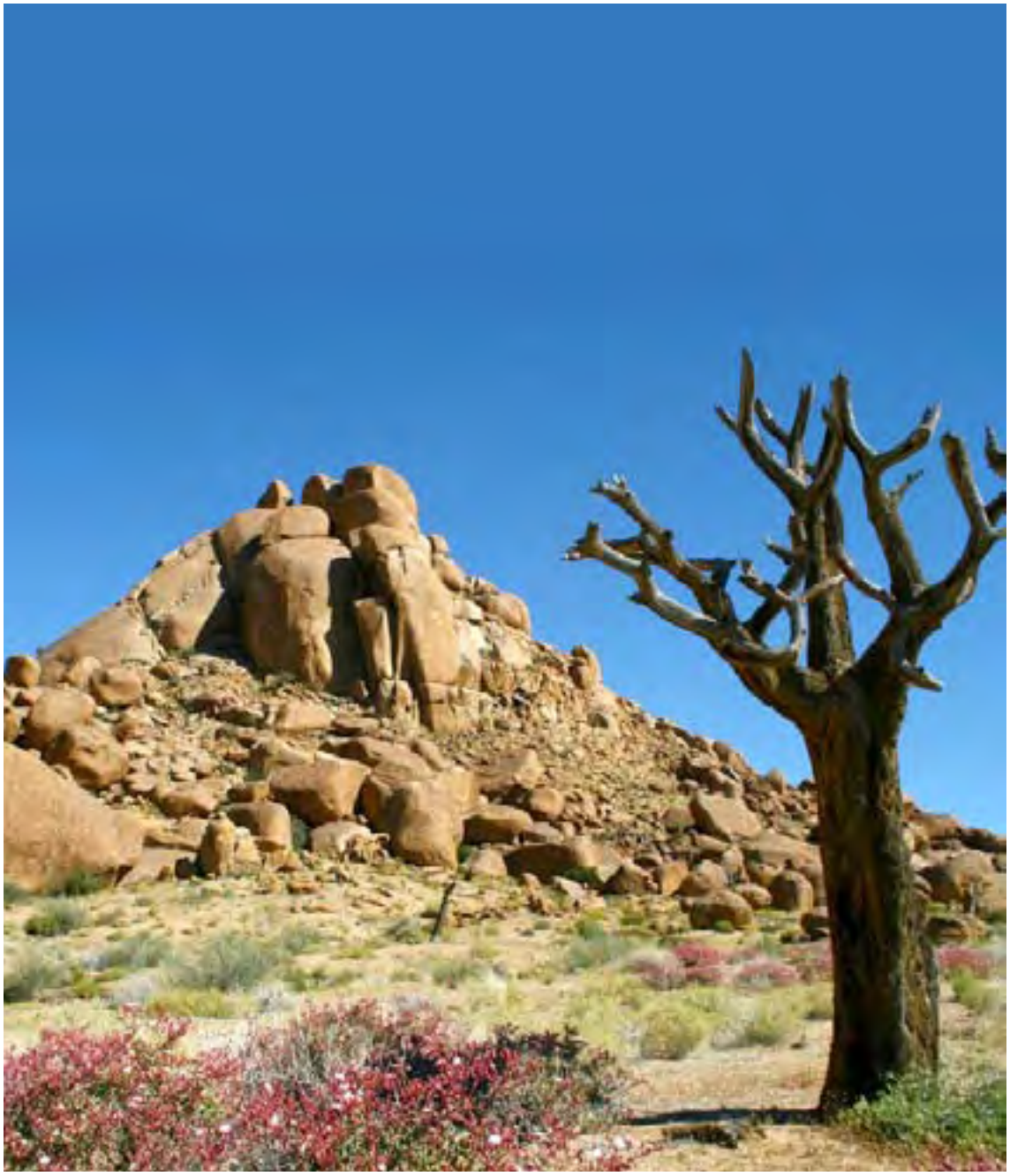
The South African government has thus far played a positive role in pushing for firm action in climate change negotiations on the international stage. It has challenged the large industrial powers to do more to reduce their own greenhouse gas emissions, to fund adaptation to climate change in developing countries and to shoulder their historical responsibility for creating the current global warming of the Earth's atmosphere. However, it can be argued that not enough has been done on the home front to hold large industries in South Africa accountable for their own historical responsibility. It is true – and commendable - that government has developed policies that outline its vision of a national transition to a climate resilient and low carbon economy. The concern though is that these policies address climate change in so far as it does not conflict with the country's 'development' under a conventional, fossil-fuel energy path, which is ultimately a contradiction in terms. South Africa is not alone in this confusion; most industrialized or industrializing countries are currently trying to have it both ways.

The first part of this report defines the problem of climate change in South Africa. It locates this within the international climate change debates and the role South Africa has played internationally. As such, it highlights the impacts identified by the National Climate Change Strategy and thus discusses the impacts of climate change on South Africa's most vulnerable communities. One of the challenges identified in this report is the lack of information on the impacts of climate change on people, and not just on the ecological and economic aspects of society. Several case studies tell the stories of some communities affected by climate change along with other pressures on the environment. However, ongoing research is key to developing adaptation plans of action.

The report then analyses possible solutions proposed by government. Two documents that are discussed in detail are the National Response Strategy on Climate Change and the Long Term Mitigation Scenarios (LTMS).

The report then highlights possible impediments to tackling climate change mitigation and adaptation measures as defined in government policies. The contradiction of economic growth and development versus climate change discourse is highlighted as government struggles to hold industry accountable for their contributions to high levels of carbon dioxide (CO_2) emissions. Eskom (South Africa's power utility company) and Sasol (liquid fuel company) are highlighted, as they are responsible for most of the country's greenhouse gas emissions.

Recommendations for government and business to undertake to tackle climate change are then outlined. The report says it is essential that civil society should become more visible and vocal in creating greater awareness on climate change in society.



The Richtersveld is a spectacular desert region in the NW part of South Africa. The Goegap or Orange river separates the Richtersveld from southern Namibia. This image portrays a dying Kokerboom (Quiver Tree). This is a worrying trend at the Kokerboom Forest and may in part be a consequence of rapid climate change in this sensitive desert ecosystem. Picture credit: The Cape Leopard Trust

The conclusion reiterates the fact that at the moment South Africa's policies are well intentioned but are too pro-industry and pro-investment at the expense of responding to climate change and thus, ultimately, to the needs of the poor – who are the most vulnerable to existing climatic vicissitudes and shocks, and the current and predicted impacts of climate change. The challenge for government, business and civil society is to outline how these different imperatives, that are currently often contradictory, can be reconciled to create pro-poor and climate-resilient development.

THE LONG ROAD TO REALISING CHANGE

Climate change is defined as, "any long-term variation in the 'average weather' that a given region experiences" and which is due to the increase in the concentration of greenhouse gases (GHGs), notably carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and chlorofluorocarbon gases (CFCs).[2] The Earth has natural processes that emit GHGs that protect the Earth from harmful radiation from the sun as well as maintain a stable temperature and climate.

However, it is now well accepted that human activities such as fossil fuel combustion, deforestation, and some industrial processes have led to an increase in greenhouse gases concentration. These excessive GHG emissions act as the name suggests like an extra pane of glass in a greenhouse, keeping in more heat that would otherwise radiate back into space, leading to increased temperatures and thus changes in climate which can cause, or contribute to, floods, droughts, sea-level rise and seasonal unpredictability across the globe.

The bulk of the global warming and consequent climate change that is happening now has been caused by the burning of coal, oil and gas over the last 150 years by what are now the rich nations of Europe and North America in order to fuel their industrial revolutions. But people on the ground right now, mainly in poorer, developing countries are feeling the impacts of climate change. These are not impacts that are going to happen in 50 years but are happening now, and will escalate if urgent action is not taken. According to Oxfam, "these impacts are undermining millions of people's rights to life, security, food, water, health, shelter and culture".[3] The case studies in this report show that climate change impacts are being experienced in South Africa no less than in other countries.

Even with such impacts, it has taken the world more than a decade to accept that climate change is indeed perhaps the greatest and certainly one of the worst environmental challenges facing life on earth and, more importantly, to accept that the direct causes of climate change and the enhanced greenhouse effect are due to human activities. The concern now is that the world is taking too long to agree on a programme of action to reduce global GHG emissions.

It was only in the early 1990s that the first signs of global debate on climate change surfaced. Since the adoption of the United Nations Framework Convention on Climate Change (UNFCCC) at the Rio Earth Summit in 1992, it has been a slow and arduous road. The Framework - which was a direct result of the work being done by the Intergovernmental Panel on Climate Change (IPCC)[4]- was a small beginning that was tasked with 'considering' what could be done to reduce global warming. The second IPCC Report provided impetus for the development of the Kyoto Protocol.

The Protocol is aimed at establishing a set of binding targets for developed countries to reduce their GHG emissions. It is accepted that developed countries have produced, and continue to produce, the bulk of the globe's carbon emissions, especially in comparison to relative population sizes; the developed world contributed roughly 40 percent of total global carbon emissions in 2006.[5] It is therefore a matter of historic responsibility, of capability to act and of simple justice and morality that they should lead the way in drastically cutting their greenhouse gas emissions. However emissions from developing countries – known as Non-Annex 1 countries - are also rapidly rising.

CASE STUDY
NO MORE TEA

The rains finally came to the Suid Bokkeveld in May. Ample fronts swirled in from the Atlantic with allusions to life and a bittersweet hope. Back to back, they pounded across the drought-dry escarpment, hurling water down onto the scrubby veld below.

This land is the last sliver of fynbos country - the most arid type of fynbos. There's not much of commercial value here, but there is rooibos tea. Rooibos has become one of the world's most sought-after health teas, and in the Suid Bokkeveld it grows wild.

Hendrik Hesselman holds the leaves of fresh rooibos tea. Suid Bokkeveld near Nieuwoudtville in the Northern Cape. May 2007. Picture credit: Leonie Joubert

For the group of about 40 sharecroppers that make up the Heiveld Co-operative, premium prices for organic, fair-trade and wild tea have changed their fortunes. Many of the landless and impoverished in the Suid Bokkeveld live a frugal existence as bywoners, tenants on mostly white-owned farms. Some also work as seasonal labourers.

Members of the co-op cultivate rooibos on their farms and also pick from wild. Although their individual harvest is small compared to commercial farmers, the income lifted their living standards. Many of the co-op members were able to open bank accounts, and some were able to spend on medical needs – previously considered luxuries. For one, it meant a tractor and trailer to replace donkey cart and bicycle. Rooibos tea may even be the ticket for land ownership for some.
But shifting long-term climate trends might put an untimely end to this growing local economy.

Water is scarce in this region, and long droughts wilt the streams and springs that so many use directly. Residents are closely dependent on the local weather cycles to deliver their water. The mountains here harvest the mists that form over the southern Antarctic, and channel the little droplets into streams, rivers, and eventually tap. A disruption to the cycles that bring the rains to the Suid Bokkeveld would be disastrous for its inhabitants.

Already, weather records going back four decades suggest that local temperature has risen by about 1°C. The rise is expected to continue, accompanied by increasingly frequent and intense drought, and slackening rainfall. Wind speed is higher on average by as much at 3 km per hour: wind dries out the soil. The winter storm tracks that bring the rains to this region are increasingly pushing south, missing the continent and dumping their water out at sea. The rooibos plantations of the Suid Bokkeveld are directly in their pathway.

Predicted species shifts towards the poles would also affect rooibos. We already see changes in species distribution. In the late 1990s, researchers investigated the widespread death of quiver trees, surveying the full range of the aloe from near the rooibos farms of Nieuwoudtville to the Brandberg Mountains in northeast Namibia. They showed that the aloe is dying in the north but thriving in the south and at higher altitudes – it was shifting towards cooler areas.

These trends are expected to continue, and many farmers are steeling themselves for it. They know that their farms cannot support the 2°C increase in temperature that is expected in the next 50 years.

Hendrik Hesselman on his far Dobbelaarskop in the Suid Bokkeveld, near Nieuwoudtville in the Northern Cape. May 2007. Picture credit: Leonie Joubert

The IPCC's findings that human activity is causing climate change has gained acceptance gradually, culminating in the award of the Nobel Peace Prize to the IPCC in 2007. However, the full implications of what the science is telling us about climate change have not yet been fully or widely recognised. In part this is because, as Munnik states, the reports developed by the IPCC are *"inherently conservative, because of the thorough preparation processes, including strict peer review, which results in the exclusion of some information and, in some cases, negotiations with political representatives before they are declared official. They tend to understate the threats resulting from global warming."*[6]

IPCC's underestimates and rather dry, measured tone seem to have failed to communicate a proper sense of urgency, and governments have reacted slowly. Climate change negotiations are now focused on the 'second commitment period', which begins in 2012.[7] The next round of negotiations could require some developing countries, like South Africa, to take on emission reductions after 2012.

The fact that many of the developed countries have come nowhere near to fulfilling their requirements under the Kyoto Protocol, and show little sign of doing, begs the question why would developing countries act differently – given their needs for development and growth.

South Africa has been playing an influential role as a developing country in the international negotiations even though it has no commitments to reduce emissions. But South Africa is also the largest emitter of green house gases on the African continent and was responsible, *"for emitting almost 318-million tons of carbon dioxide in 2003"*.[8] Furthermore, South Africa is the world's most carbon intensive economy and Sasol's Secunda plant is the world's single biggest emitter of CO_2.[9]

Although it is not (yet) under any legal obligation, South Africa has a moral obligation to reduce its emissions, which would also send a powerful political message to the world and increase the strength of its negotiating position in global climate change talks and its leverage in demanding emissions cuts from rich countries.

2 Baede, A.P.M. (ed.) (2007) 'Glossary of Terms used in the IPCC Fourth Assessment Report', http://www.ipcc.ch/glossary/index.htm
3 Raworth, K. (2008) 'Oxfam International's Briefing Paper, Climate Wrongs and Human Rights', www.oxfam.org/en/policy/bp117-climate-wrongs-human-rights-0809
4 The IPCC is a scientific intergovernmental body established by the World Meteorological Organization (WMO) and by the United Nations Environment Programme (UNEP) in 1988. Its first Assessment Report influenced the adoption of the United Nations Framework Convention on Climate Change (UNFCCC) at the Rio Earth Summit.
5 The Worldwatch Institute (2008) 'State of the World – Innovations for a sustainable economy', www.worldwatch.org
6 Munnik, V. (2008) 'The Gathering Storm - Climate Change Mapping in Southern Africa', South Africa: Oxfam International
7 Hallowes, D. and V. Munnik (2007) 'Peak Poison: The elite energy crisis and environmental justice', Pietermaritzburg: Groundwork
8 Science in Africa (2006) 'South Africa's greenhouse gas emissions under focus', http://www.scienceinafrica.co.za/2006/september/greenhouse.htm
9 Earthlife Africa Jhb (2008) 'Press Release: Minster Van Schalkwyk's Doubletalk', http://www.earthlife.org.za/?p=206

SOUTH AFRICA'S DILEMMA

South Africa is faced with a difficult challenge in trying to juggle three imperatives to change – development (conventionally conceived of as being based on fossil fuels), poverty eradication and climate change. On the one hand, the country has to fast track provision of adequate transport, power, communication networks, water, sanitation and other infrastructure services. Much of this development implies that South Africa's GHG emissions will increase. The provision of these services is essential to improving people's well being and to reducing poverty. On the other hand, conventional development as carried out in South Africa (like many other countries) has not focused on reducing poverty, will not reduce it by itself, and may sometimes exacerbate poverty and ill-health. And now South Africa also has to respond to the impacts of climate change, which are increasing the country's vulnerability to poverty, diseases, droughts and floods, and it has to do this both through reducing emissions and through adaptation.

South Africa's energy sector is the single largest source of carbon dioxide and sulphur dioxide emissions. The sector includes electricity generation, emissions from oil and coal refining to produce petroleum products, coal mining and gas extraction, wood burning, and the burning of coal and oil to produce heat for industrial purposes. The country's large coal reserves supply over 70% of the country's primary energy. South Africa has been able to enjoy an abundant and cheap supply of electricity from coal-fired power stations, which supply almost 95% of the country's electricity.

The recent energy crisis in the country has resulted in power cuts, load shedding and an unreliable supply of electricity. The cause of the energy crisis has been attributed to a number of issues including a shortage of coal at Eskom's power stations, South Africa's robust economic growth and a rapid increase in the number of electrified homes, which grew from 1.2 million customers in 1990 to 4 million in 2007. In addition, generating capacity declined from 45,000MW (in 1994) to between 37,000 to 40,000MW (in 2008). This points to the single greatest factor behind the 2007/08 power cuts; lack of investment in the energy sector. The government simply did not spend in the early part of this decade, despite Eskom's requests to do so.

This has resulted in Eskom bringing mothballed coal-fired stations online as well as planning to build new coal-fired stations to meet current and future demand. It seems that government's focus during these crises was to ensure that the economy was not affected even if this meant more GHG emissions – and tragically, very little focus was put on renewable energy sources.

CASE STUDY
EMPTYING THE BREAD BASKET

One of Amy Whitfield Hoar's diary entries for January 1932 described a typical Free State summer: "Dry," she wrote, "mealies dying. The last good rains fell in November." A month later, conditions hadn't improved: "No rain, hot and dry. Lionel chopping out some of his mealies. Clouds come up every day, then the west wind takes them away." Two years later, she wrote: "Terrible hailstorm this afternoon. Nearly two inches of rain. Poor sheep just shorn. 108 dead from wet and cold."

Nthombifuthi Mbhele waters the gardens. The dry ground is poor in nutrients so the community are learning to use fertiliser and diversify their crops. The Intergovernmental Panel on Climate Change (IPCC) predicts that maize, wheat and soya-bean yields will fall significantly and that crop revenues will drop by as much as 90% by 2100. Picture Credit: Matthew Willman/Oxfam AUS

This is typical for South Africa. Its climate is naturally variable – predisposed to cycles of drought and flood, with no reliable way to predict the weather a few years ahead. About 2.3 million hectares of the country is used for maize and the Free State is the most productive maize province, with nearly a million hectares farmed without irrigation. What happens here has implications for families across the country.

2007 saw the worst drought in 50 years, and the Whitfield farm, now managed by Amy's grandson Albert, was not spared. *"Just after planting, the maize was growing prolifically. It was beautiful!"* exclaims Albert, *"And then the rains just stopped. January and February were very, very dry."* When he made his early season crop estimate, Albert expected five or six tons of maize per hectare, comfortably above the farm's three to four ton average. But the harvest that year was just two tons per hectare.

The effects of maize shortages ripple throughout the country. A complex interaction of market forces determines the maize price, with heat waves and drought driving prices higher. By the close of 2006, food price increases were already outpacing inflation.

It is the economically marginal who feel the pinch, not because there's no food, but because even staples are too expensive. And it's also these communities who are grappling with longer-term stresses such as access to health care and poor education.

How a farmer runs his or her business, and whether he or she keeps it afloat, is critical to a country's ability to feed itself. He or she plants what the market demands and sells where prices are high. But the inherent contradiction of food security is that where food is most needed is not always where people can pay the highest prices. Climate change is expected to reduce productivity in many maize regions. Models anticipate an amplification of natural weather variation: increased frequency and intensity of heat waves and droughts; greater inundations of rain; increased evaporation.

And this is a country where the need for water and staple food will outstrip the country's ability to supply them. The population of South Africa, Swaziland and Lesotho is expected to climb from 47 million today to 70-90 million by 2035. South Africa's demand for water is expected to exceed available resources by 2025. An annual increase in production of three percent is needed to meet growing food requirements, but instead, climate models suggest that by 2050, we can expect a decline of 10 to 20 percent.

Amy Whitfield's grandson, Albert, who now manages the farm. Due to the 2007 drought, the maize harvest was just two tons per hectare against his early season crop estimate of five to six tons. Picture credit: Leonie Joubert

CLIMATE CHANGE IN SOUTH AFRICA

South Africa is already a climatically sensitive and water-stressed country. Much of the country is arid or semi-arid and the whole country is subject to droughts and floods. Any variation in the rainfall or temperatures would thus exacerbate the already stressed environment. Most South African crops are grown in areas that are only just climatically suitable and with limited water supplies.

The impacts of climate change will thus worsen the serious lack of surface and ground water resources, exacerbate desertification and may well alter the magnitude, timing and distribution of storms that produce floods.

The combination of the impacts of climate change on the environment as well as South Africa's large GHG emissions have been a key stimulus to the detailed studies and documents on the impacts of climate change produced by the South African government. The intention of many of these studies is to establish mitigation[10] measures that would reduce the countries emissions. The 2004 National Climate Change Strategy (NCCS) used the Global Climate Models[11] to explore the potential impacts on South Africa for a period of 50 years.

The following changes have been predicted:

- A continental warming of between 1 and 3 deg C.
- Broad reductions of approximately 5 – 10 % of current rainfall, but with higher rainfall in the east and drier conditions in the west of South Africa.
- Increased summer rainfall in the northeast and the southwest, but a reduction of the duration of the summer rains in the northeast, and an overall reduction of rainfall in the southwest of South Africa.
- Nominal increases in rainfall in the northeast of the country during the winter season.
- Increased daily maximum temperatures in summer and autumn in the western half of the country.
- An extension of the summer season characteristics.
- Wetter conditions with a reduction in frost could see malaria mosquitoes expand their range onto the Highveld.

The NCCS identified the following areas of concern over the next 50 years – human health, maize production, plant biodiversity, water resources, rangelands and animal species.

The global climate models predict that a hotter drier climate will result in maize production in South Africa decreasing by almost 20%, which amounts to a loss of almost R681 million a year (using 2000 Rand amounts). The NCCS highlights that agriculture in South Africa contributes approximately 3.7% to annual GDP, with maize as a key crop in supporting rural livelihoods. This climate change prediction would massively increase food insecurity, migration and malnutrition.

One of the first signs that things may get worse is the National Department of Agriculture's warning to farmers in the central Karoo (Eastern Cape) who are currently affected by a severe drought. It has been reported that the national government has warned that this drought, *"may no longer be regarded as a disaster"* but rather new norm, and a manifestation of climate change.[12] It is not enough for government to merely issue such statements without also releasing plans to ensure that people's livelihoods of commercial and subsistence farmers are not destroyed. Research by Oxfam reveals the impact of climate change already hitting people's livelihoods and the need for an improved government response to these communities.

CASE STUDY
WHERE HAS ALL THE WATER GONE?

Thandi lifts up a handful of soil and watches as it disappears through her hands. Once rich and fertile and capable of producing bountiful crops, the soil is now bone dry. “The ground used to be soft and easy to dig by hand; water was freely available just under the surface and food was plentiful; there was a lake nearby that provided fish for us to eat,” Thandi says. “But now the land is dry and hard and there is no water under the surface; even the lake has dried up.”

These beetroots survived but only because they were watered by hand. The rains didn’t come this year. Jozini, South Africa, 2006.
Picture credit: Matthew Willman/Oxfam AUS

Nthombifuthi Mbhele waters the gardens. The dry ground is poor in nutrients so the community are learning to use fertiliser and diversify their crops. Picture credit: Matthew Willman/Oxfam AUS

Thandi sits with a group of men and women under the shade of a large tree in Hluhluwe, a small town in KwaZulu-Natal province in the north-eastern corner of South Africa. Hluhluwe is a poor community struggling to contend with eight years of drought, high unemployment, rising poverty and some of the highest malaria and HIV rates in the country.

Now, after years of fighting for access to adequate health care, food, clean water and sanitation and striving to reduce the effects of HIV and AIDS and conflict, the Hluhluwe community is facing another battle — climate change.

This is what has brought me here. Oxfam Australia works with 10 partners in UMKhanyakude to help communities with high levels of HIV grow and obtain enough food to eat. While largely unaware of the term 'climate change', the local communities are concerned about the effects of prolonged drought and extremely low rainfall on their crops.

Hluhluwe is one of six communities I am visiting in UMKhanyakude to get a better understanding about the effects of climate change here — what impact it is having, what communities know about it and how they are adapting to it. As I talk with the men and women of Hluhluwe, the conversation quickly turns to the weather and how it has changed in the past 50 years. *"The weather is much hotter and drier and more humid,"* says one. *"We can't tell as much difference between summer and winter anymore,"* says another. *"We used to talk about when the drought would end; now we are thinking that maybe it is not going to end,"* says another. *"I don't see how things are going to get better."*

Although the people of Hluhluwe have experienced droughts and floods for as long as they can remember, since the mid-1990s they have noticed a gradual drying of the land. The ground was once so lush that people could use their hands to dig for water just below the surface. But those times have long gone. Even the rainwater tanks that were installed as a solution now stand dry. The local council sends a truck to fill up the tanks, but there is no delivery schedule, nor any guarantee the truck will return.

While we are there a truck comes, but is only able to half-fill one tank. This water will only last a week or so. To cope with the water shortages, the community has sunk a borehole but had to dig more than 80 metres to find water. They plan to use this water for a community garden that will provide nutritious food for Hluhluwe's most vulnerable residents. There is no guarantee that the borehole will last, but it is their best hope.

Yellow maize. Picture credit: Leonie Joubert

The facts are simple. Without water, the community's crops and gardens won't grow. Without these vital fruits, vegetables and grains, people aren't able to get the nutritious foods they need to stay healthy. And in a community affected by HIV and AIDS, this has devastating consequences.

Thandi, who works with Oxfam partner Hluhluwe Advent Crèche, says rainfall has become more erratic over the last few decades, occurring less frequently and for shorter periods. Adds Ntombifikice from the Ithembalesizwe Drop-In Centre: *"The seasons are not the same as they used to be; winter is not as cold now and summer rains are more erratic."*

Although the people I speak with know the climate is changing, they don't know why it's happening; nor have they heard about global warming or have any knowledge about the current global debates on these issues. *"We don't know what is causing these problems,"* says Eunice, from Hluhluwe Advent Crèche, *"perhaps the world is coming to an end."*

In speaking to the men and women of Hluhluwe, one thing is clear — they desperately want to learn how to adapt to the changes in climate in the longer term. At the moment they are simply trying deal with the prolonged drought conditions as best they can, by doing what they have always done but on a reduced scale. They make their gardens smaller, grow different types of crops and walk further to collect water — short-term coping mechanisms, not long-term solutions.

"We need water pipes," Thandi says. *"We need to learn how to look after the land and adapt to the drier conditions; we need to grow more drought-tolerant crops and vegetables; we need to learn more about climate change; and we need training in how we can speak up on these issues."*

Oxfam is working to help communities adapt to climate change and prepare for added burdens it will bring. We will support communities who are most at risk of losing their livelihoods; and demand greater international action on reducing greenhouse gas emissions and helping communities adapt to the changes. In short, we will make sure climate change becomes central to our development processes.

Source: **Sterret, C.** (2007) 'Where has all the water gone?' Oxfam News Winter edition Melbourne: Oxfam Australia. Charlotte Sterrett, formerly Oxfam Australia's Southern Africa Program Officer, is now Oxfam GB Global Advisor on Climate Change Adaptation.

The NCCS has also predicted a reduction in viable planting areas for forestry. The impact on this sector could be about 80,000 jobs lost in formal employment in forestry and a further 120,000 lost in industries that process wood.

Climate change modelling also suggests that South Africa's plant biomes will experience a reduction of the area covered by up to 55% in the next 50 years due to warming and aridification trends. For example; the succulent Karoo biome could be completely lost by 2050. These biomes are important not only because of their ecological importance but also for medical and research uses.

The study further suggests that major animal species losses will occur due to aridification. It is predicted that in the Kruger National Park alone, 66% of species have a high probability of extinction including 97% of bird species. This will have a direct impact on the tourism industry, which is responsible for R80.6 billion of GDP. [13] Tourism could be affected by loss of habitat and biodiversity, and changes to temperature, humidity and increased health risks.

In a water stressed country, there is no doubt that the water resources will be impacted. Runoff into the main rivers is likely to be reduced over much of the country, an increase in dam siltation will occur, wetlands are drying and a decrease in major catchment areas will be the major concerns. Estuaries will experience greater salinity and coastal fresh-water aquifers will be contaminated to a greater degree by salt water.

The management of the water resources in South Africa is a time bomb waiting to explode – the country has a shortage of water, the existing resources are poorly managed or privatised. In addition, there are still millions of people in South Africa without access to clean water.

In early 2000, as part of the post-Growth Employment and Redistribution (GEAR) framework, local government began privatising water utilities which resulted in millions of poor people being unable to pay their water bills and being cut off from supply.[14] McKinley highlights that, *"the collective impact of water privatisation on the majority of South Africans has been devastating,"* and has contributed to inadequate hygiene, poor sanitation systems, an increase in environmental pollution, and cholera outbreaks that have claimed the lives of hundreds of people.[15]

A case in point is the cholera outbreak in Kwa-Zulu Natal in 2001 when almost, *"200 people died of cholera after having been forced to drink water from polluted streams due to Umgeni Water Board charging the poor residents of Ngwelezane for water provision".*[16] It these are the challenges facing the country now then the change in water supply due to climate change can only worsen the situation. The disease outbreaks may seem small and seasonal but this could become a regional problem and a prolonged challenge.

Using the global climate models, the National Response Strategy (NRS) has been able to explain the impacts that climate change will have on the ecological and economic aspects in South Africa. Turpie (et al) estimates that the overall losses due to climate change could be 1.5% to 3% of GDP. Using 2000 GDP figures (R874 billion), 3% could amount to R26 billion. Such estimates fail to take into account the cost of irreparable damage to the Earth and the loss of people's lives. It also fails to give a human face to climate change.[17]

10 'Mitigation' is used in the sense of reducing greenhouse gas emissions.
11 A Global Climate Model is a research tool using computers to study and simulate the climate and thus develop climate predictions and scenarios.
12 Joseph N. (2008) 'Climate change could reclassify drought', September 4th 2008,ttp://www.iol.co.za/index.php?sf=181&set_id=1&click_id=13&art_id=vn20080904054134647C220506
13 Turpie, J., H. Winkler, R. Spalding-Fecher and G. Midgley (2002) 'Economic Impacts of Climate Change in South Africa: A Preliminary Analysis of Unmitigated Damage Costs', South Africa: University of Cape Town
14 McKinley, D. (2008) 'Water is life: The Anti-Privatisation Forum and the Struggle against Water Privatisation', http://www.sarpn.org.za/documents/d0000584/P531_McKinley.pdf
15 Ibid
16 Ibid
17 Turpie, J., H. Winkler, R. Spalding-Fecher and G. Midgley (2002) 'Economic Impacts of Climate Change in South Africa: A Preliminary Analysis of Unmitigated Damage Costs', South Africa: University of Cape Town

CASE STUDY
SOUTH AFRICA UP IN SMOKE?

An in-depth research project by the Tyndall Centre for Climate Change Research supported by Oxfam, found that farmers in three areas of South Africa were acutely aware that climate change was happening around them, and were taking steps to respond to new and more uncertain conditions.

Farmers in South Africa are experiencing climate change. Wetlands in particular are under threat from increased drought as well as erosion and over-extraction of water. Wetlands are crucial, both for subsistence farmers and for the health of ecosystems downstream. They provide for free, a range of ecosystems services such as water purification and storage, reeds for crafts and building, wild foods and medicine, and grazing for livestock all of which are important contributors to household income and quality of life. Picture credit: Rehana Dada, Working for Wetlands

The "Adaptive" research project investigated farmers' perceptions of, and responses to, changes in the summer rainfall area of South Africa. Their perceptions were correlated to meteorological records. These confirmed that, indeed, climate is changing. In Mantsie in Limpopo the dry season is becoming longer and the wet season starting later, meaning that droughts are becoming more frequent. In Khomele in northwest province early wet season rainy days have been increasing. In eMcitsheni in KwaZulu Natal rainfall, which is already highly variable, has become increasingly uncertain with people reporting higher and more violent rains early in the season and less rain later in the season.

For farmers in South Africa, the concepts of 'drought' or 'extreme rainfall' are not necessarily sufficient to capture the dynamics of climate variability. Factors such as: the timing of the onset of first rains (which affects when crops are planted), the distribution of rainfalls within the growing season, and the effectiveness of the rains, are all real criteria that affect the success of farming. Therefore better drought forecasting per se may not be enough to help people cope with climate uncertainty and change.

Individual people in the case study areas showed an acute awareness of the changing climate trends around them. Where repeated exposure to an event has occurred, such as drought in Mantsie, familiarity and experience mean it can be viewed very differently from other 'surprise' events (like flooding), which occur less often. As one farmer said: *"Drought is easier to cope with because we are used to it, the heavy rains are not good because we need a little and often."*

The Adaptive work identified differing types of response to climate variability and change. The strategies are either means of simply getting by or coping, or represent real forms of adaptation to the changes in rainfall. Some of these responses, such as diversifying livelihoods, are not unique to climatic upheaval, but importantly were clearly identified by rural people themselves in this study as deliberate responses to climate triggers. People defined "adaptation" strategies as being longer-term measures, as opposed to merely "coping". Adaptation in their eyes included such things as changing farming practices in various ways – such as gardening, obtaining short-maturing crop varieties or breeding indigenous varieties of livestock. The Adaptive project found that some forms of response were occurring in all three areas. Commercialising small-scale agricultural production was important in all areas, creating a source of cash that can then be used flexibly to meet household needs. People also identified help and advice from government as important for both adaptation and for coping.

The findings illustrate that concerns about the effects of climate change on rural societies are justified: climate change is happening, and it is affecting activities that depend on the natural environment. However, far from being passive victims, people recognise even subtle changes in climate, and take steps to respond to them. Some of these responses may be positively beneficial; some though, may be harmful, in the short or long term, for example borrowing or looking for wild foods.

Either way, people are making significant changes in their lives. Inevitably, there will be winners and losers in the process. Some people will adapt more successfully than others, and it may be that climate change will result in a polarisation of wealth and well-being in ways we have not seen before.

John Magrath, Oxfam GB Programme Researcher, climate change. Source: Africa Up in Smoke? The second report of the Working Group on Climate Change and Development, June 2005, ISBN 1 904882 00 5.

The WGCD comprises many of Britain's environment and development agencies, including Oxfam, united by a common concern about the impacts of climate change. The full series of Up in Smoke reports is available from new economics foundation (www.neweconomics.org) or the International Institute for Environment and Development (IIED) on www.iied.org

The Adaptive project ran from 2002 to 2005. It was funded by the Tyndall Centre for Climate Change Research and supported by Oxfam. It was a collaboration between the Universities of Oxford and Sheffield, UK, and the Climate System Analysis Group at the University of Cape Town in South Africa. Potchefstroom University was also a partner. Collaborative interests included Save the Children (USouth Africa), University Eduardo Mondlane, Mozambique, Nkuzi Development Association, South Africa, and the Department of Agriculture, South Africa. See www.geog.ox.ac.uk/research/arid-environments/projects/adaptive/index.html

THE FACE OF CLIMATE CHANGE

"Would our friends in the industrialized world think differently if the side effects of climate change were worse than extended summer months and the arrival of exotic species in the northern hemisphere?"
Emeritus Archbishop Desmond Tutu

The human dimension of climate change is frequently lost as much of the focus and attention in international negotiations and news bulletins is on the scientific and economic issues and key animal species like polar bears. By 2080 an estimated 1.1 billion to 3.2 billion people might be experiencing water scarcity, 200 million to 600 million might be experiencing hunger, and two million to seven million more a year facing coastal flooding.[18] Given these figures, it is time for the social impacts of climate change to be given just as much attention and focus.

Climate change impacts on every aspect of life and it is widely accepted that the world's poor are the most vulnerable to the impacts of climate change. Even relatively small changes, such as inexorable temperature increases, shifts in seasons and unpredictable rain patterns can destroy livelihoods and plunge people into poverty. Furthermore, poor people usually live in areas most prone to potential disasters from flooding, cyclones, droughts, etc.

Poor people tend to have limited resources to cope with the impact of global warming. Poorer communities are more dependent on ecosystems for their livelihoods or help in times of emergency. According to Hunter, "*rural households tend to rely heavily on climate-sensitive resources such as local water supplies and agricultural land; climate-sensitive activities such as arable farming and livestock husbandry; and natural resources such as fuel-wood and wild herbs.*" Natural resources such as fish, grazing land or forests provide income, food, medicine, tools, fuel, and construction materials amongst others. One of this report's case studies explores the lives of fishers on the west coast being impacted upon by government policies, over fishing and environmental changes.

Apartheid's legacy has further exacerbated the situation. South Africa is one of the wealthiest middle-income countries but has a high level of poverty. Furthermore, poverty still continues to be drawn along racial lines despite almost 15 years of democracy. The number of black people affected by poverty in the country increased from 16.3 million in 1996 to 20.1 million in 2006.[20] The government uses R354 per adult per month (35 USD or 1.20 USD/day) (2002) as the national benchmark; make R500 a month (50 USD or 1.70 USD/day) and you are not poor according to the government.[21] As much as things have changed for a privileged few, some things have remained the same, if not become worse, for the majority of South Africans.

Land degradation is a significant issue especially in respect of the most vulnerable within society. Poor black South Africans were relocated or displaced under apartheid and thus forced to locate themselves in marginal, unsuitable, environmentally poor and sensitive areas without adequate shelter and basic services. Rural populations have to struggle to live off the land while for the urban poor – especially for people living in informal settlements - changes in climate exposes them to increased risk of fires, flooding and threats to health and food sources.

In South Africa, women often head rural households, with men migrating to cities to find work. Women are usually responsible for fetching water, fodder, firewood and growing and cooking food. They bear an even greater and unfair burden when provision of these vital necessities becomes difficult. Their health and safety are jeopardised as they have to travel further from their homes and traverse difficult territory to find such resources, and the more difficult and time-consuming it becomes to complete all their everyday work.

CASE STUDY
A LITTLE BIT OF NOTHING

A West Coast fisher lives and dies by the wind. Take the easterly – it sweeps across the Karoo, traverses the Cape fold mountains, creeps up behind that wispy filament of sand that divides continent from ocean, and then heads inexorably out across the Atlantic. This is the dangerous one - it could easily take a boat out with it, losing its skipper and crew in that formidable expanse of ocean. Then there's Aunt Sophie, the south-easter. She brings the coldest waters into the one nautical mile zone that these fisherfolk frequent. The fish don't bite when she drops in.

Lamberts Bay harbour June 2007. Picture credit: Leonie Joubert

It's the northerly wind that the fisherfolk of Lambert's Bay are most fond of. This is the one that stirs up warmer waters. When the temperate currents run, that's when the fish bite.

Ernest Titus was born into a century-old fisher tradition along the Cape West Coast, one of the world's biologically richest and most productive fisheries. But his access to a natural space that he considers his back yard has all but been cut off, thanks to the complexity of the post-apartheid transformation of the fishing industry and the associated minefield of policy governing fishing rights.

Prior to 1994 – South Africa's first democratic election - , it was mostly white-owned enterprises that were allocated annual fishing quotas. Traditional fisherfolk earned a living by fishing for these companies. Then, in 2006 when policy changed and new long-term quotas were allocated, many traditional fishers were excluded from the only way of life they knew.

Ernest was one of the lucky ones. He was given a 10-year quota for West Coast rock lobster that allows him to take 750 kg of lobster each year. In the 2005/6 season, he filled that quota in eight days and made close to R70, 000. The next season he wasn't able to fill his quota before the season ended. His boat is named Stukkie Ding, reflecting the little bit of nothing that was given to the Lambert's Bay fisherfolk. He understands the need for managed access to the sea, for "sustainable use" of its bounty, but it seems unfair to him that traditional fisherfolk have such limited access. Born into modest homesteads, these fishers feel trapped on the economic fringe. Now they face more enduring challenges. Not only are these once-abundant fisheries in a state of decline, but also the ocean current that creates the abundance may be being altered subtly.

The Benguela Current is a cold body of water that moves north along the western coastline of southern Africa. It brings to the surface nutrients from the cold sea floor that feed marine algae. Zooplankton graze the algae, fish eat the plankton, birds and mammals eat the fish. It's a food chain that is driven by the circular action of ocean current and wind.

Shifting climate trends could be disrupting the functioning of the current with consequences for both line fishing and lobster catches. It is already evident that there is a 1°C rise in sea surface temperatures around the coast since the 1940s and wind speeds are on average faster by about one to three kilometres per hour. Climate change is considered a potential reason for the deterioration of the West Coast fisheries but chronic over-extraction of fish has also taken its toll – 18 line fish species have collapsed because of over harvesting, and another four are considered over-exploited. It is also possible that the decline could simply be the result of a little-understood natural cycle.

For the rock lobster, though, something entirely different is at play and it manifests as mass walkouts and death of these spiny creatures. Certain combinations of wind and sunlight availability can result in red tides – a situation where there is overgrowth of algae and poor oxygenation of water, which effectively leads to eutrophication in the ocean. If these red tides are close to the shoreline, lobsters are forced towards the shallows and into the intertidal zone. When the tide heads back out, they remain to die.

Red tides and lobster walkouts are on the increase, possibly due to altered wind activity. During the 1990s, five mass walkouts occurred, leaving over 2,200 tons of lobster rotting on the shore. Three of these were the worst on record. Already, lobsters have shifted their distribution in the southern part of the Benguela and declined in the central part, possibly the result of heavy fishing pressure exacerbated by the increase in incidences of low oxygen waters.

With the West Coast fishing communities already facing immense threats to their livelihoods, and the fisheries already in a state of decline simply because of over-exploitation, the additional challenges posed by climate change are likely to result in enormous economic pressures in the region.

Key findings of the Benguela Current Large Marine Ecosystem Programme (BCLME Programme) as at May 2007 indicate that changes in the current are a result of changing climate. For example, there is strong evidence of warming at the northern and southern boundaries of the Benguela system and an increased frequency of "warm events" off southern Angola and northern Namibia in the past decade or so, with potential consequent de-oxygenation of water on the Namibian shelf. However, chemical oceanographer Stephanie de Villiers, points out that there has also been an increase in El Nino events in the past decade, which makes it hard to say which changes are attributable to climate change and which to natural weather patterns – although climate change may also increase the likelihood of El Nino-like conditions occurring more often in future.

She says that there is clear evidence that human activities have resulted in increased atmospheric concentrations of greenhouse gases, and that this is creating significant changes to climate patterns, but cautions that unless records go back longer than 100 years, it is difficult to attribute specific localised changes to climate change entirely, *"It doesn't rule it out, it just means that we need to be open about the possibility that some of this is about longer-term natural cycles. If we're going to be able to be confident about our climate change predictions, then we need to have a stronger understanding of natural variability."* She says that in the immediate term overfishing remains the biggest problem – changes to fish populations affect the entire food web and even change the biogeochemical processes in the system.

The programme has identified the following indications of possible climate change influences on the ecosystem :

- A change in wind patterns in both the northern and southern parts of the system.
- Sea level rise at approximately the same rate as the rest of the world.
- Increase in zooplankton by approximately ten-fold over the past five decades.
- Changes in pelagic fish populations that are not entirely attributable to overfishing.
- Decline in horse-mackerel species in Namibia and southern Angola.
- A northwards shift in deepwater hake in Namibia.
- Shifts in seal and bird distribution and a decline in some bird populations.

Ernest Titus. Lamberts Bay on the Cape West Coast, June 2007. Picture credit: Leonie Joubert

De Villiers says that we still know too little about the system, *"If the winds change, will they shift northwards or southwards, or will they increase in intensity? Will the changes be only very localised, or will the entire system respond in a similar way? And we also don't know what the impacts of these changes are – will it lead to increased or decreased productivity? If there is increased upwelling as a result of the change in the winds, it may increase productivity and boost fisheries, but it may also lead to more red tide events and that will affect the lobster populations."* She concludes saying that there are many unknowns and variables, and that these processes need to be studied more intensely over the entire region. Understanding the system will be critical for adequate planning for adaptation.

Dr Stephanie de Villiers is a chemical oceanographer at the University of Fort Hare. She studies long-term climate change at the University of Washington in Seattle, using marine-based proxy records including corals and deep-sea sediment cores. steph.devilliers@gmail.com
The Benguela Current Large Marine Ecosystem Programme is a joint initiative by Angola, Namibia and South Africa to manage and utilise the resources of the system in a sustainable and integrated manner. www.bclme.org

Girl children are also denied education as they must withdraw from school and spend more time assisting with household chores. In some cases, women have to resort to prostitution to obtain the income to feed their children. This exposes women to HIV and AIDS, rape and violence.

HIV and AIDS is already one of the main challenges that the country has to grapple with and climate change will further increase the vulnerability to health risks of people living with the disease. The Treatment Action Campaign believes that most people who are living with HIV and AIDS live in informal settlements that are, due to climate change, more susceptible to droughts and fires, floods and the destruction of flimsy houses.[22] Climate change could increase the prevalence and distribution of vector-borne diseases such as malaria and dengue fever and water-borne diseases such as cholera and dysentery. Such things mean that people with affected immune systems would experience increased challenges to survive. Turpie (et al) suggest that as a result of climate change, there will be a, *"four-fold increase in the size of the population at risk of malaria within the next ten years".*[23]

The resultant increase in death rates will put a greater strain on communities and households. In addition, it is estimated that the cost of these increased deaths could be around R1 billion a year (and that is only for malaria).[24]

The strain on communities across Southern Africa in terms of food, water, health and livelihoods is expected to get worse with the impacts of climate change. As such it is envisaged that migration to South Africa will increase - one of the many survival strategies in times of stress. An increase in the already rapid pace of urbanisation could also result.[25]

The Australian military reportedly warned of climate conflict in an unpublished report which stated that *"Environmental stress, caused by both climate change and a range of other factors, will act as a threat multiplier in fragile states around the world, increasing the chances of state failure".*[26]

It is clearly absolutely crucial to reduce global greenhouse gas emissions to avert the threat of temperatures rising so far that they bring about catastrophic climatic change. However, even if emissions are reduced drastically and rapidly, a certain amount of continuing temperature rise is "locked into" the oceans and atmosphere. South Africa is still an economically unequal society and the poorest are the most vulnerable to the impacts of climate change. Therefore, adaptation to climate change is absolutely necessary. Just as South Africa supports international policies to ensure that developing countries do more to respond to climate change, so too should the South African government develop national policies that will do more to lessen the impacts on the vulnerable communities. It is clear that more research is required to obtain greater insight into the impacts of climate change on poor people and on appropriate adaptation policies.

It is clear, however, that measures to reduce people's current vulnerabilities to climatic extremes and unpredictability will have a double benefit. Poor people will be more able to cope with today's climatic uncertainties and better equipped to cope with whatever changes the future brings. Much of what is needed to adapt is not new or mysterious, it is what people like Thandi in the case study from Hluhluwe identify as needed right now – the government to respond to community voices, support community efforts, provide clean water and sanitation, adequate health care, access to drought tolerant seeds and help to diversify livelihoods and overcome crises. This is "no regrets" adaptation, good for both now and the future.

18 Christian Aid (2007) 'Human Tide: the real migration crisis', http://www.christianaid.org.uk/resources/policy/climate_changes.aspx
19 Hunter, L.M. (2007) 'Climate change, rural vulnerabilities, and migration', http://www.prb.org/Articles/2007/ClimateChangeinRuralAreas.aspx
20 Gauteng Treasury (2008) 'Gauteng Socio-economic Review', Johannesburg: Gauteng Provincial government
21 McKinley, D. (2006) 'The Making of a Myth: South Africa's Neo-Liberal Journey', http://vryeafrikaan.co.za/lees.php?id=497
22 Geffen, N. (2008) 'What do South Africa's AIDS statistics mean? A TAC briefing paper', http://www.tac.org.za/community/aidsstats
23 Turpie, J., H. Winkler, R. Spalding-Fecher and G. Midgley (2002) 'Economic Impacts of Climate Change in South Africa: A Preliminary Analysis of Unmitigated Damage Costs', South Africa: University of Cape Town
24 Ibid
25 Christian Aid (2007) 'Human Tide: the real migration crisis', http://www.christianaid.org.uk/resources/policy/climate_change.aspx
26 The Australian Military report is titled 'Climate Change, The Environment, Resources and Conflict'. The report is quoted by the Sidney Herald, http://www.smh.com.au/news/environment/global-warming/defence-warns-of-climate-conflict/2009/01/06/1231004021036.html

IS GOVERNMENT RESPONSE TO CLIMATE CHANGE ADEQUATE?

The South African government must be commended for the stance it has taken consistently over the years on climate change. As a large emitter of GHGs it would have been easier for South Africa to carry on with a 'business as usual' attitude and wait until 2012 when a new international greenhouse gas reduction agreement may mean that developing countries as well as developed ones will have to account for and reduce their emissions. However, the South African government has been engaged with climate change since at least 1997 when it signed the United Nations Framework Convention on Climate Change (UNFCCC).

Furthermore, the government has focused on transforming its national policies and strategies related to the energy sector – an important development given that 70% of the country's primary energy comes from coal. Current energy policies promote investment in coal, nuclear energy, carbon capture and storage, and biofuels research.

Since 1994, South Africa has given impetus to changing and developing legislation to deal with the Apartheid legacy. As such, South Africa has mastered the art of developing policies and strategies. In most cases these documents are well written and well intentioned; however experience shows that they often fare poorly in terms of implementation and monitoring. A long list of government documents mention climate change but are quite vague in terms of implementation plans. The following represents some of the key national policies and strategies related to climate change that government developed:

- White Paper on Energy Policy (1998).
- The National Waste Management Strategy (1999). Department of Environmental Affairs and Tourism.
- South Africa First Country Studies (2000) including the Synthesis Report for the Vulnerability and Adaptation Assessment. This report includes a range of reports on vulnerable sectors (health, malaria, agriculture, water, biodiversity and forestry).
- Johannesburg Plan of Implementation 2002.
- The NEMA Air Quality Act (2004). Department of Environmental Affairs and Tourism.
- South African National Climate Change Strategy 2004. Department of Environmental Affairs and Tourism.
- Renewable Energy Policy of South Africa White Paper 2004. Dept of Minerals and Energy.
- Electricity Regulation Act (2006).
- Disaster Management Act and the National Disaster Management Framework.
- The Bio-fuels Industry Strategy. Dept of Minerals and Energy, 2008.
- Long Term Mitigation Scenario Planning study (2008) and associated technical reports. Department of Environmental Affairs and Tourism.

For the most part, climate change is given a mere mention in most of these and other documents. For example, it is referred to in the White Paper on Integrated Pollution and Waste Management of 2000, and referenced in the White Paper on a National Water Policy for South Africa, 1997. It is also addressed in the government's National Water Resource Strategy, the National Environmental Management: Air Quality Act and in the White Paper on Renewable Energy. For example, in the White Paper on Renewable Energy climate change is discussed very briefly in terms of the international context of renewable energy. It merely touches on the Kyoto Protocol and the implications for South Africa as a Non-Annex 1 country.

The two key policies that focus explicitly on climate change are the National Climate Change Strategy (NCCS) (2004) and the more recent Long Term Mitigation Scenario (2007).

The NCCS was designed to address priority issues in terms of climate change in South Africa. The NCCS, a rare climate change strategy amongst developing nations, helped place South Africa in a strong position in international climate change negotiations.

The strategy identified health, maize production, plant and animal biodiversity, water resources, and rangelands as areas of highest vulnerability to climate change and thus regarded these areas as those that need to be targeted for adaptation measures. With regard to vital industries, the strategy identified the mining and energy sectors as particularly vulnerable to climate change mitigation measures. Being dependent on cheap power for their profitability, they are vulnerable if energy costs rise.

However, the strategy seems to imply that South Africa must respond to climate change but not at the expense of economic growth and development. The focus of the strategy was on the economic impacts of climate change. There is no mention made on the impacts of climate change on the most vulnerable people affected by diseases, loss of livelihoods and extreme poverty. In other words, the strategy is caught between an economic development discourse and a social justice discourse. So it contained contradictions. On the one hand it was the first realisation that benefits could be derived from adopting a future strategy designed to move the economy towards a cleaner development path. On the other hand it did not rule out the increase of emissions due to 'economic development'.

The Long Term Mitigation Scenarios (LTMS), released by government in 2008, is the most recent document on climate change. The LTMS process was defined in two stages. First, the scenario building phase centred on research relating to carbon emissions, the potential for reductions and the economic implications defined in terms of the impact on GDP growth, employment and equity. Second the 'high level group' (HLG) process was to involve a 'dialogue' of the Inter-ministerial committee on climate change and 'leaders' from business, labour and civil society.

The LTMS is primarily focused on how South Africa can reduce emissions of GHG, and should be hailed as the beginnings of a proper climate change mitigation strategy. The Department of Environmental Affairs & Tourism (DEAT) should be applauded for taking the political effort to develop this strategy, whatever the LTMS's faults may be.

The LTMS includes different scenarios of mitigation action for South Africa and a technical report that is underpinned by technical inputs and research on energy emissions, non-energy emissions, and a macro-economic analysis. The combination of the scenario document and the technical reports serve to inform long-term national policy and provides South Africa with a position in multilateral climate negotiations on a post-2012 climate regime.

In a media statement in July 2008, the Minister of DEAT described the document as, *"the best insurance policy current and future generations will have against the potentially devastating impacts of climate change. By adopting this strategic direction South Africa takes a leading position in the developing world and demonstrates it is ready to shoulder its fair share of responsibility as part of an effective global response".*[27]

The LTMS starts from a base year of 2003 and continues to a 2050 horizon, and proposes two scenarios in regards to GHG emissions:

- Growth Without Constraints
- Required by Science

In the Growth Without Constraints (GWC) scenario GHG emissions are projected to lead to an almost four-fold increase in GHG emissions from 446 million tons of CO_2-equivalent in 2003 to 1640 Mt CO_2-eq by 2050. It is suggested that most of the emissions and the largest part of the increase comes from the energy sector. Hallowes points out that the assumption made is highly unrealistic, as it would imply that *"South Africa achieves the Asgisa*[28] *growth targets, that climate change does no damage, and that oil, water and other resources are available to meet demand".*[29]

However, so far GHG emissions are indeed still rising in line with this scenario.

The Required by Science (RBS) scenario shows South Africa's emissions peaking and then declining. This scenario asks what would happen if South Africa reduced emissions by 30% to 40% from 2003 levels by 2050. Current scientific thinking is that industrialised countries need to institute 90% emissions cuts by 2050 from 2003 levels. The RBS scenario paints a very different picture of South Africa in 2050. The scenario assumes investment in new technologies, such as renewables, hydrogen based transport and changes in human behaviour patterns.

The LTMS presents four strategic priorities which when implemented together, would allow South Africa to achieve the RBS Scenario. These options are titled start now, scale up, use the market and reach for the RBS Goal.

For the RBS scenario to work the following issues were assumed – that international climate consensus is reached and effective, there are sufficient international flows of appropriate technology/ finance, peak oil[30] arrives, oil is scarce and expensive, there are carbon taxes on coal and a high degree of trade integration and globalisation exists.

Hallowes observes that even with the LTMS process, there was a leaning towards the, *"current dominant economic players in terms of representation, sources of information and modelling assumptions. Some of its assumptions are highly questionable, such as the belief that carbon capture and storage is a viable technology, the real effects of energy efficiency measures in an economy striving for growth, and the view that nuclear energy is an appropriate response to climate change".*[31]

Hallowes highlights the shortsightedness of all these assumptions. He suggests that it is possible to reach a global consensus - but this does not necessarily imply that the consensus may be effective. The UNFCCC promises technology transfers but little or nothing has yet happened and Hallowes believes such transfers are incompatible with the World Trade Organisation process that upholds intellectual property rights. He suggests that the conclusion that peak oil may drive greater energy efficiency and technology innovation may be false. The search for the last drops of oil or oil replacements could result in greater energy and carbon intensity and dirtier production.[32]

The national government has set up a roadmap for the national process going forward from 2009 to 2012:

- National Climate Change Response Policy Development Summit (March 2009) (Adopt LTMS findings)
- Sectoral policy development work (February – June 2009)
- Post-2012 negotiation positions (Up to July 2009)
- UNFCCC post-2012 negotiations concluded (Copenhagen, December 2009)
- National policy updated for implementation of international commitments (March 2010)
- Green Paper published for public comment (April 2010)
- Final National Climate Change Response Policy published (end 2010)
- Policy translated into legislative, regulatory and fiscal package (from now up to 2012)

The Stern Report warns that the cost of inaction will far outweigh the cost of taking action.[33] The implication is clear: South Africa needs to act now rather than producing more policy. According to the above timeline, it will be almost 4 years before there is a new set of targets and an action plan. In the mean time, GHG emissions will continue to rise, making the necessary reduction harder and harder to obtain.

There is a particularly big gap in two of the most crucial areas for moving South Africa to a low-carbon development path; the fields of energy efficiency and renewable energy. government has set a national target of 12% improvement in energy efficiency across the board by the year 2014, which will contribute towards a reduction in carbon emissions. The White Paper on Renewable Energy (2003) also proposed an inclusion of 10 000 GWh of renewable energy in South Africa's energy mix for the next decade; the country currently produces a total of 240,000GWh annually. In both cases, the underlying policies are weak. They have not been implemented with any urgency, and the impact on emissions as a result has been negligible.
From the policies reviewed, there is very little or nothing about the impacts of climate change – or mitigation scenarios or adaptation plans - on the most vulnerable communities. At first sight this seems a strange oversight. However, a study by Seekings and Natrass concludes that South African government policies do not adequately protect the

most vulnerable communities. They emphasize that government has favoured a growth path that entails rising productivity, wages, and profits for workers and firms in the formal sector. Their article stresses that the post-apartheid system, *"promoted economic growth along a path that was not a pro-poor one."* [34]

This view is supported by McKinley who states that government policies such as the Growth, Employment and Redistribution strategy (GEAR) and Asgisa have focused on, *"supporting and strengthening the upper 'floors' in the (vain) belief that doing so will not only make the house look more presentable but will somehow work its way down to the foundation".*[35]

Current policies have neglected the poor in the hope of developing a larger middle class, which would, in theory, trickle down wealth to the poor. This has not happened.

It could be argued that given the fact that almost half the population (21 million) of South Africans are living in poverty, the South African government should have a public welfare system that makes provision for the millions of people who do not qualify for a pension or child support as they are either not old enough for a pension nor young enough for child support. Furthermore, government should have a system that would make provision for people who are unemployed or who have never been employed.[36]

The great danger is that in terms of climate change policy, vulnerable sectors (poor, women, children, people living with HIV and AIDS) and rural livelihoods are not being given the requisite attention. government policies continue to benefit key industries and thus effectively condone high emissions in the name of economic growth. Furthermore, different parts of government act in opposing directions, with the result that policy and practice do not match up. For example, the Minister of DEAT has made strong progressive statements regarding emissions cuts and the need to avoid the worst effects of climate change. At the same time, government has given its blessing to the construction of a new Sasol coal-to-liquids (CTL) plant that would boost the country's CO_2 emissions even further.

Another example of such confusion in government policies relates to the rollout of gas in Khayelitsha in the Western Cape. government ran a campaign to change people's electric stoves to gas stoves. The problem was that the cost of gas then skyrocketed; hence, people could not afford to buy gas but had the equipment. A government proposal to regulate the price of gas (at a lower cost) was opposed and stopped by the Competitions Commission. It seems that even if government attempts to act in the interest of the poor, its own structures and policies block the way.

26 The Australian Military report is titled 'Climate Change, The Environment, Resources and Conflict'. The report is quoted by the Sidney Herald, http://www.smh.com.au/news/environment/global-warming/defence-warns-of-climate-conflict/2009/01/06/1231004021036.html

27 Van Schalkwyk, M. (2008) 'government Outlines Vision, Strategic Direction and Framework for Climate Policy', http://www.info.gov.za/speeches/2008/08072816451001.htm

28 Accelerated and Shared Growth Initiative for South Africa

29 Hallowes, D. (2008) 'A Critical Appraisal of the LTMS', Johannesburg: SECCP of Earthlife Africa
[Note: At the time of developing this report David Hallowes was the only researcher to have studied and critiqued the LTMS in detail. He is thus quoted extensively as there were no other comparable analyses available].

30 Peak oil is the moment when half of what can be pumped from the earth has been used. It is also regarded as the point of maximum production. It is believed that at the peak, the production of oil will decrease resulting in a higher demand than supply.

31 Hallowes, D. (2008), ibid

32 Hallowes, D. (2008), ibid

33 Osbourne, H. (2006) 'Stern Report: The key points', http://www.guardian.co.uk/politics/2006/oct/30/economy.uk

34 Seekings, J. and N. Natrass, (2006) 'Class, Race and Inequality in South Africa', University of KwaZulu-Natal Press.

35 McKinley, D. (2006) 'The Making of a Myth: South Africa's Neo-Liberal Journey', http://vryeafrikaan.co.za/lees.php?id=497

36 Seekings, J. and N. Natrass, (2006) 'Class, Race and Inequality in South Africa', University of KwaZulu-Natal Press.

People on their way to work, Cloeteville - many of the women in this photo are setting off to work on nearby farms. After low wages, lack of transport was the second biggest concern of many women farmers interviewed by Oxfam supported Women on Farms Project. Women workers say it is difficult to get home after work, there is no transport available after working overtime, and a general lack of transport to get to medical centres, or to take the children to school. It is urgent to invest in an efficient public transport system. Picture credit: Paul Weinberg/Oxfam

THE OBSTACLES

Government may produce dozens of policies to reduce GHG emissions but if these policies do not actually restrict the emissions of the main culprits, then these policies will not be worth the paper that they are written on. Corporations in South Africa have the potential to obstruct – or catalyse – any real change.

Since 1994, government's overarching aims for the country's development have been encapsulated in three consecutive policy frameworks – the Reconstruction and Development Programme (RDP) in 1994, GEAR in 1996 and Asgisa in 2006. These frameworks were based on resolving the macro-economic problems under Apartheid. The policies gave rise to the promotion of both national and foreign investment. There was often a lack of foresight and understanding of the challenges facing the poor communities in South Africa. Delivery became a numbers game.

As industries grew the demand for energy increased, thus increasing South Africa's GHG emissions. South Africa's dependency on coal-fired power stations has resulted in a yearly per capita emission rate of about 10 tons of carbon dioxide; 43 percent higher than the global average. The industrial and mining sectors consume 62.7%,[37] thus it is clear that these sectors must be targeted to create significant reductions of South Africa's emissions. At the same time, this extremely high per capita energy use has not meant that everyone in South Africa has access to energy; 30% of South African citizens do not have access to electricity.

Government – through Eskom - provides cheap electricity to industry. In contrast, government's free basic electricity policy proposed that poor households be provided with 50kWh of free basic electricity (only enough for basic lighting, a small black and white TV, a mall radio, basic ironing and basic water boiling through an electric kettle). Anecdotal evidence suggests this lasts one or two weeks out of four. The programme was limited in its reach in rural areas because of the expense of extending the grid.

Also, many informal households in urban areas were not electrified, partly because they are settled on un-proclaimed land. In addition, while government has facilitated bulk access of cheap electricity for industry it has promoted the installation of pre-paid electricity metres in poor households.

In effect, government's energy policies and cheap electricity have provided industry with a 'license to pollute' through emitting carbon dioxide and other environmentally damaging gases. A review by the Carbon Disclosure Project (CDP) suggested that, "*South Africa's top companies on the JSE [Johannesburg Securities Exchange] are aware of the effect of climate change but are failing to translate this into action.*"[38]

This report focuses on the climate change polices of Sasol and Eskom as these are the two biggest emitters of GHGs in South Africa.

Sasol is a Coal-to-liquids (CTL) company that was established under Apartheid as a way of securing white South Africa's independence on foreign oil. The company is responsible for producing almost 72 million tons of CO_2 a year and its Secunda CTL plant is the single biggest emitter of CO_2 on the planet. Given these figures, it is in the company's business interest to reduce its emissions: as climate change debates take centre stage in the lead up to the Copenhagen climate change conference at the end of 2009 and beyond, the world is bound to scrutinize countries and companies that have high emissions. Sasol's reputation is at stake.

Sasol's policy identifies energy efficiency, engaging with governments and carbon dioxide capture and storage (CSS) as key focus areas. The company has set targets that stipulate GHG intensity reduction target of 10% on the 2005 baseline by 2015 and a nitrous oxide reduction equivalent to one million tons of CO_2.

CO_2 hide and seek[39]

According to Greenpeace, carbon capture and storage (CSS) is a complex system that involves three main steps:

Carbon capture Fossil fuels are converted to a gas before combustion and CO_2 is extracted in the power plant. Alternatively, CO_2 is captured from the stream of combustion gases.

Carbon transport A system or mechanism (e.g. pipeline) transports CO_2 from the production to the storage site.

Carbon storage CO_2 is injected into the storage site. In the case of geosequestration these are geological formations such as deep saline aquifers, depleted oil and gas fields or un-mineable coal seams.

CCS is only in the pilot phase - Australia having the only plant at present. The concern with CCS is that it does not currently reduce the amount of CO2 being spewed into the atmosphere – and it may never do if the technology fails to work effectively. And if CO2 is captured, CCS creates a false belief that if CO2 is out of sight then it is out of mind. Greenpeace believes carbon capture and storage technology is:

Too costly: There is no evidence available that indicates CCS is the most economical mitigation option. Greenpeace says research indicates it is cheaper and more effective to reduce the amount of carbon dioxide produced in the first place. Focusing on CCS also diverts financing away from truly sustainable mitigation options.

Too little: CCS would deliver too little emissions reductions and could even jeopardise stabilisation in the future. More effective and rapid mitigation options include energy efficiency improvements, the switch to less carbon intensive fuels and renewable energy technologies. These are safe, technologically mature, economically feasible and presently available.

Too risky: Climate change requires immediate action and a coherent response that can be implemented today. CCS is a technology whose large-scale commercial application cannot be realised within the next twenty years, if at all. The IPCC confirms that for a widespread application of CCS, *"technical maturity, costs, overall potential, diffusion and transfer of the technology to developing countries and their capacity to apply the technology, regulatory aspects, environmental issues and public perception"* are still to be proven.[40]

The Climate Action Network describes CCS as, "*an end of pipe response which raises the fundamental issue of intergenerational equity and shifts the responsibility to manage our waste to future generations. In terms of certainty and efficiency it is far better to respond to climate change by not creating greenhouse emissions in the first place. Renewable energy, energy efficiency and reducing demand allow us to do this."*

The policy seems quite impressive but has not managed to stop Sasol (in conjunction with the state owned Industrial Development Corporation) from planning to construct a new 80,000 barrels per day CTL plant in Limpopo. The government has given the new CTL plant its blessing, stating that the demand for petrol and diesel expanded strongly in tandem with South Africa's growing economy and thus the plant is needed to meet the demands of growth. Another CTL plant within South Africa will increase the country's CO_2 emissions even further, and would make a mockery of the aims of the Long-Term Mitigation Scenarios.

In addition to the GHG emissions of a new CTL plant, there are serious water implications. According to the LTMS technical report, the water requirement per new CTL plant is colossal – approximately 40 million m3 per annum. In a water scarce country that is going to see significant rainfall changes as a result of climate change, is this really the best strategic choice?

South Africa has benefited from an abundant and cheap supply of electricity since the founding of the monopoly public utility, the Electricity Supply Commission (later renamed Eskom) in 1928. The act establishing the monopoly mandated that electricity be sold at cost. Artificially low labour costs under Apartheid, combined with South Africa's large reserves of coal, enabled Eskom in effect to subsidize industrial development and to become a surplus producer, ultimately exporting electricity to neighbouring countries. The low cost of South Africa's electricity has deterred foreign power companies from entering the market.

Eskom is responsible for supplying 95% of the country's abundant and cheap supply of electricity - most of which comes from coal-fired power stations. Eskom's emissions are 2.8 times higher than Sasol's, due to its reliance on burning coal to generate electricity and it accounts for about half of South Africa's total emissions. Eskom reports that with electricity supply growing at a potential 4.4% per annum and traditional coal-fired technologies remaining at a high percentage of the electricity generation mix (approximately 90%), CO_2 emissions from electricity generation would more than double over the next 20 years. Eskom's new build-programme will certainly keep South Africa on the high emissions path described by GWC in the LTMS well past 2020.

On the other hand, Eskom is part of the National Committee on Climate Change (NCCC) and participated in the LTMS process. It has developed a six-point plan on climate change:

- Diversification of the generation mix to lower carbon-emitting technologies
- Energy efficiency measures to reduce demand and greenhouse gas and other emissions
- Adaptation to the negative impacts of climate change
- Innovation through research, demonstration and development
- Investment through carbon market mechanisms
- Progress through advocacy, partnerships and collaboration

The six-point plan looks remarkable but what this means in terms of actual projects is not clear. Eskom's plan suggests changing the energy mix to include nuclear, gas, renewables and clean coal components. Presently, most of Eskom's investment has been in new or mothballed coal-fired stations and another nuclear station. Eskom recently shelved this planned nuclear station due to escalating costs. A concern is that the investment could now be diverted to construction of additional coal-fired stations.

Eskom is embarking on a capital-intensive programme to increase its generating capacity. Its current plans are almost entirely based upon expansion of its fossil fuel base. Eskom is currently planning to bring three mothballed stations back into production, build two open-cycle gas turbines (OCGT), three new coal-fired power stations, two pumped storage schemes, and a single wind farm (only 100MW capacity).

This new build programme is set to cost, according to Eskom R343 billion. The capital costs of the build programme have already increased from an initial R97 billion to R150 billion to R343 billion in the span of two years. In addition, Eskom plans to reduce demand to the tune of 3,000MW by 2012 and 8,000MW by 2026.

Eskom boasts about a wind farm in the Western Cape as its contribution to alternative energy. The contribution of renewable energy to Eskom's build plans to 2016 is negligible at a mere 100MW for a single wind farm. In addition, Eskom's SWH programme, which aims to replace 900,000 solar water heaters over five years, only managed to install 800 SWH (nationally) in 2008. This strongly indicates that Eskom has no meaningful plans to use renewable energy as a resource. Eskom's 'new build' programme, if fully realised, will keep South Africa on the high emissions path described by GWC well past 2020.

37 Hallowes, D. and V. Munnik (2007) 'Peak Poison: The elite energy crisis and environmental justice', Pietermaritzburg: Groundwork

38 Salgado, I. (2007) 'Action for clean air is slow', http://www.cdproject.net/view-news-item.asp?id=154&recent=1

39 Greenpeace Australia (2006) 'Submission to the House of Representatives Standing Committee on Science and Innovation Inquiry into geosequestration technology', http://www.dpi.vic.gov.au/DPI/dpinenergy.nsf/9e58661e880ba9e44a256c640023eb2e/339793cacd755ca6ca2574ea001fa26a/$FILE/ATTSOY0E/Greenpeace%20Submission.pdf

40 Metz, B., D. Ogunlade, H. de Coninck, M. Loos, and L. Meyer (eds) (2005) 'IPCC Special Report: Carbon Capture and Storage – Summary for Policymakers and Technical Summary', www.mnp.nl/ipcc/pages_media/SRCCS-final/ccsspm.pdf

ANOTHER WORLD IS POSSIBLE

If we are to address climate change, the current energy system must be reviewed with urgency. South Africa is officially committed to renewable energy targets and sustainable development through its legislation. The 15% renewable energy target by 2020 is not unrealistic. The problem however is the slow pace with which government is addressing renewable energy. The 15% target would ensure emissions reductions of around 165Mt of (CO_2 Equivalent) CO_2-eq over the period 2006 to 2020, with higher reductions of up to 400Mt if combined with energy efficient programmes as well.

Energy efficiency would allow the country to 'grow' economically, create employment and reduce emissions and thus counter views that development and growth must entail an increase in emissions.

Beyond coal

But, how much potential is there in South Africa for renewable energy? The potential is, in fact, enormous. Modelling and research over the last five years indicates that 50% of all electricity generation can come from renewable energy, with the South African government agreeing with this model in the LTMS. As one of the premier researchers in the field, Jason Schaffler, states: *"The main constraints are neither resource availability nor techno-economics but a limiting mindset focussed on the supply-side, partial energy costing, low (indirectly subsidised) energy prices and short-term thinking favouring low initial costs. Dominance of the state-controlled power monopoly and the influence of vested interests (particularly of the minerals sector) on key stakeholders are exacerbated by a lack of awareness and informed leadership as well as a real shortage of person power. It is concluded that the most important constraint is not money, men, machines, materials or management, but the motivation, the inspired political will."* [41]

Another highly promising technology is Concentrating Solar Power (CSP) that uses large parabolic troughs to focus sunlight to create steam to generate electricity. South Africa has colossal potential. A forthcoming study is expected to show that the potential nominal capacity for generating CSP in South Africa is 547.6GW. That potential is spread throughout the country, and only takes into consideration sites with sufficient proximity to transmission lines. In comparison, the total currently installed power generation capacity in the country is only 39.5GW.[42]

The time to harvest South Africa's renewable resources of wind and solar is now. Technology costs have been declining rapidly over the past decade. If the full costs to the economy of power generation using highly polluting fuels such as coal were explicitly acknowledged in national accounts, then renewable energies would already be cheaper.

Clean renewables have other advantages. They are ideal components of a decentralised generation network, which creates the potential to place generating capacity close to where power is needed – making for a more efficient overall system. Greater efficiency also leads to lower costs for the consumer. At the community level, many communities who have been previously considered 'resource poor' in South Africa may actually have access to land with good potential for renewable energy. Given the right policy frameworks and the right partnerships, many of South Africa's low-income communities could be benefiting from new income streams from these resources.

CASE STUDY
RENEWABLE ENERGY AND JOB CREATION

The current financial crisis should be viewed as an opportunity for all societies to shift to a low carbon economy rather than seeing it as an impediment to action. The global slow-down is causing job losses and hardship to many, but equally, climate change means that it would be reckless to try to go back to fossil fuel based development pathways that will have to be abandoned soon anyway. This is an opportunity to redevelop economies and create a new industrial revolution that develops and is powered by clean energy technologies. Doing so will create new jobs and a secure future for all. Clean energies also hold out much greater hope that communities that lack electricity from the central grid and who struggle to find fuel for cooking will see their energy needs met.

Thembe carrying firewood - her family rely on wood for cooking and boiling water, since they have no gas or electricity. Each day wood has to be collected. After chopping down branches from large bushes, Thembe uses a panga to strip them of leaves, ties the bundle together with a plaited rope made from strands of long grass, and carries them home on her head. Picture credit: Paul Weinberg/Oxfam

In South Africa in particular there is a desperate need to create jobs within the economy, and, in particular, semi-skilled and unskilled jobs. The creation of a renewable energy industry in South Africa could make a serious contribution. A study conducted by Agama Energy,[43] quantifies and characterises the direct jobs that could be created in South Africa through implementation of wind, solar and bio-energy for both electricity generation and thermal/transport energy services. The study draws comparisons with employment associated with conventional energy sources such as coal, nuclear and natural gas. The Agama Energy research revealed the following:[44]

A government commitment to a target of 15% of total electricity generation capacity in 2020 for the development of Renewable Energy Technologies (RETs) will lead to the creation of 36,400 net, direct jobs in the South African economy.

As well as those 36,400 jobs in electricity generation, many more jobs will be created in the wider Renewable Energy (RE) sector, the breakdown of gross direct jobs in 2020 being estimated as:

- 180,000 in the biofuels sector, with 15% ethanol and diesel substitution;
- 118,400 in the solar water heating sector, to manufacture and install a 2.8 m2 solar water heater on each house in the country;
- 1,150 in the residential biogas sector; with 150,000 residential biogas digesters installed in rural areas.

The figures represent a conservative assessment of the total technical employment potential of the industries concerned The total number of direct jobs in 2020 could rise to around 500,000, with approximately 700,000 indirect jobs being created.

The employment opportunities in the RE sector are in contrast to the trend of declining employment levels in the coal-based generation sector.

The increased uptake of RETs for electricity generation will not displace jobs in the conventional energy sectors by 2020, since this study projects a total of 52,000 jobs in the electricity generation sector in 2020. This would comprise the 36,400 RET jobs, and approximately 15,600 coal-related jobs. In the longer term, deployment of RETs can slow down the overall losses in employment in the energy sector as a whole.

Measured against energy generation, or energy generation-equivalent in the case of solar water heating and biofuels, biodiesel offers the most number of jobs per TWh, with nuclear energy providing the fewest jobs.

The combination of the 2008 power blackouts and a limited Eskom subsidy has already seen a significant rise interest in solar water industry. This is a vital requirement in the energy sector as jobs in the coal sector are declining, primarily due to mechanisation of mines.

The question is will the fossil fuel economy, as witnessed through Eskom's current plans, provide not only new jobs but also jobs to replace employment lost in the coal industry? The answer seems to be no.[45]

As the table below shows, the jobs available per MW capacity are the lowest under fossil fuels and the highest under renewable energy. The choice of source of energy does have a direct bearing on the amount of jobs that are available in the economy.

Conventional energy technologies	Direct jobs per MW capacity	Direct jobs per GWh generated	Renewable energy technologies	Direct jobs per MW capacity	Direct jobs per GWh generated
Coal (current)	1.7	0.3	Solar Thermal	5.9	10.4
Coal (future)	3	0.7	Solar PV	35.4	62
Nuclear	0.5	0.1	Wind	4.8	12.6
Nuclear PBMR	1.3	0.2	Biomass	1	5.6
Gas	1.2	0.1	Landfills	6.0	23

Energy inefficiency in low cost housing[46]
Of the 1.5 million RDP (Reconstruction and Development Programme) houses built from 1994 to 2003, only 8% incorporated some principles of energy efficiency. This means that these houses require more energy (electricity from the grid, paraffin, coal, firewood, chipboard, etc.) to heat the homes than would be required from an energy efficient house.

RDP houses have no roof ceilings or insulation. This results in heating "escaping" the house, and greater energy expended to heat an RDP house during winter months. Further, RDP houses do not have geysers or other such measures to heat water; this forces residents to heat water on two-plate stoves or over coal/wood/paraffin burners. This is a highly inefficient way of heating water. Lastly, residents in RDP houses use energy inefficient appliances such as "normal" light bulbs. These three main defects in a RDP house result in residents having to pay more in energy services. The costs of building an energy inefficient house (i.e. increased energy costs) are shifted from the state to the citizenry.

In terms of the costs, the Kuyasa Project—a NGO development project which installed solar-water geysers, roof insulation, and energy efficient light bulbs in RDP houses in Khayelitsha—proved that energy efficient measures in RDP houses reduced residents electricity bills by R625.83 per annum, electricity usage decreased from an average of 19.4% per annum, and CO_2 emissions reduced from 6.82 tonnes of CO_2 per annum per household to 5.53 tonnes of CO_2. These are significant savings given the low-income levels (R3, 500 per month or less) of households, and these interventions are by no means the only interventions that could be made.[47]

The Kuyasa Project had an intervention cost of R6, 160.00 per house. This would drop significantly with economies of scale. Further, while the state may "save" on one hand by not building energy efficient RDP houses, it spends on the other hand by having to build power stations to service that energy efficiency. Subsequently, the true capital cost of building minimally energy efficient RDP houses (SWH, insulation, fluorescent light bulbs) should be minus the avoided cost of power generation.

Widening the Gap
McKinley, in 'The Making of a Myth: South Africa's Neo-Liberal Journey', says *"Underlying this mass poverty and inequality is the widespread lack of quality basic services, especially in rural parts of the country. The United Nations Development Programme's Report entitled, 'South Africa Human Development Report' (2003), found that the number of households considered deprived of access to 'good' basic services increased from 5.68 million to 7.24 million between the 1996 and 2001 censuses. Relative to the size of household population in 1996 and 2001 respectively, the percentage of the population deprived of such basic services increased from 63% to 65% of the overall population.*

In South Africa's main urban centres, the 'Cities Report' revealed that the increase in the amount of shack dwellings is almost equal to the total number of houses built between 1996-2001, that the number of households without electricity and water (whether unconnected or disconnected) virtually matches the number of those who receive these services and that 2/3rds of urban adults have not completed basic secondary schooling."

However, setting the right policy framework is critical if we are to realise this potential. With the right framework, both the private sector and new community enterprises will take off and rapidly become a big part of the solution to South Africa's power shortage. Without it an opportunity will be missed. The National Energy Regulator (NERSA) is to be congratulated for considering a Feed in Tariff scheme to support renewable energy – a policy tool that has been shown to work the world over. This tariff must be set at the correct levels to stimulate inwards investment. For wind this probably needs to be 1.05 rand – 1.10 ran / KWH to ensure good uptake. Other technologies need looking at on a case-by-case basis. The tarrifs should be set to provide reasonable returns for efficient RE operations but not so high that the RE boom penalises poor consumers. NERSA should also consider additional support for community-based enterprises, such as capital subsidies, that could further stimulate the local economy and add a whole new meaning to empowerment of local communities.

Carbon taxes

So government must get serious about actually reducing greenhouse gas emissions, but how? The Minister of Environmental Affairs and Tourism has repeatedly stated that there would be a stricter regulatory framework and a hefty price on carbon in the future. This is not the first attempt of government to flex its muscles. With the release of the LTMS, the government announced that targets will be set for reducing emissions, and that government may impose a carbon tax to limit the country's contribution to global warming. The LTMS proposes a carbon tax of about R100 per ton of CO_2 emitted. The Mail and Guardian calculated that Sasol's Secunda plant will take the possible carbon tax to a total of R7 billion, while Eskom would have to pay R23 billion - or more than half its current R40 billion turn-over -for the 236 million tons of carbon dioxide emitted a year.[48]

The idea of a carbon tax is a good one. Corporations must be held accountable for their emissions; however it clearly cannot happen in one blow, as this would surely bankrupt the likes of Eskom and Sasol, impact on South Africa's economy and result in thousands of people losing their jobs. On the other hand, this is no excuse for inaction resulting in ever increasing emissions. Instead a gradual tax be implemented over a number of years. Conditions could be set relating to progressive investment in renewables and/or the monies raised ring fenced in whole or part to investment in renewables and energy efficiency. Some companies have advocated for Clean Development Mechanism (CDM) projects instead of a carbon tax. However, CDM is still controversial, as some believe that this would give companies a licence to continue polluting while privatising the air. It is important that the carbon tax is not dismissed before it even begins.

In moving forward, government has to take responsibility for the inaction of industry. Yes, it has developed policies on climate change. These policies must be accompanied by implementable plans and actions and more importantly a visible change in government policy to hold industry accountable. Until then, corporations will provide obstacles to finding solutions and enacting change.

In addition, poor and vulnerable communities in South Africa need the right help to adapt to the unavoidable consequences of climate change. As we have said earlier, the fact is that even if all emissions are stopped now the cumulative impact of existing emissions will still be experienced. It thus makes sense to adapt to possible impacts no matter what. People are developing their own mechanisms to adapt, but more assistance is needed from government. Communities facing rising temperatures, with associated stress on water supplies, crops and animals need the right policies put in place straight away. Those policies must uphold the principles of economic, social and environmental justice; the economy must be subservient to the needs of people.

CASE STUDY
SASOL: GAMING THE CDM SYSTEM?

In December 2008, Sasol formally applied to register a project with the United Nations Framework Convention on Climate Change (UNFCCC) Clean Development Mechanism (CDM); i.e. they requested the right to produce and sell carbon credits. This project is a 645km natural gas pipeline running from Mozambique to its Secunda coal-to-liquids plant in South Africa, along with the requisite gas conversion and processing technology and the development of natural gas fields in Mozambique.

Windfarm in Germany. Germany has become a world leader in wind and other renewables. South Africa could do the same. Picture credit: Wally Menne, Timberwatch

Sasol claims that it needs to find a new source of fuel as the coalmine that previously fed its coal-to-liquids Secunda plant has reached the end of its lifespan. It had the option of either opening a new coal mine, or building a natural gas pipeline from Mozambique. The company chose the natural gas option.

Using natural gas instead of coal will reduce greenhouse gas emissions, and, hence Sasol's argument for registering as a CDM project. The value of the carbon credits is considerable. The Financial Mail states:

These aim to save 6,4 Mt of GHG a year, and have the potential to earn Sasol carbon credits revenue of R1,1bn/ year over 10 years. These include using gas from Sasol's Mozambique-Gauteng pipeline to replace coal as the feedstock at two Sasol plants, and electricity generation from methane gas at its Secunda plant.[49]

Sasol states that if there was no option to sell carbon credits, it would not have built the pipeline, and it should therefore qualify for the CDM. Sasol, in its application to UNFCCC states that, *"The activity and investment by Sasol in 2001 demonstrates that the CDM incentive was seriously considered by Sasol during its decision making process."*

But there are several concerns around this claim. Firstly, there was strong local opposition to a proposed new coalmine for the Secunda plant, and Sasol's other option of trucking in coal from Sasolburg to Secunda was proving to be unprofitable. Further, there is credible evidence that the plant would have converted to natural gas regardless of benefits under the CDM system. In other words, Sasol would have made this fuel shift as part of its business plan.

In 2005, a researcher for the Centre for Civil Society, Graham Erion, attended a public meeting where, according to Erion, Sasol's Natural Gas Supply Manager, Peter Geef, stated: *"Yes we are indeed trying to get some carbon finance for this pipeline...(But) we have this problem of additionality; we think there's a case to be made for that, we're in discussion with the South African government now and we're trying to make the case for it...The biggest issue is additionality; we would have done this project anyway."*[50]

When asked why they were applying for carbon credits, Mr. Geef is said to have stated, *"mainly financial reasons; you get a lot of pay-back in terms of dollars per tonne".*[51]

Sasol denies that these statements were made. However, the question remains, was Sasol planning to implement the pipeline and the Secunda and Sasolburg conversions in the absence of CDM and, most crucially, planning before the 1st of January 2000, as mandated under UNFCCC rules? Somewhat surprisingly, the answer seems to be in Sasol's own Annual Report in 1999, before the advent of CDM, and is worth quoting at length:

"Sasol's pursuit of alternative hydrocarbon sources advanced appreciably in Mozambique where Sasol Petroleum International (SPI) and its joint venture partners, Arco of the USouth Africa, Zarara of the United Arab Emirates and EMH of Mozambique, continued their exploration for natural gas in the Temane field. They have, to date, discovered a reserve of world-class size, presently under certification of an exceptionally high quality. Sasol believes that the possibility of Mozambique being able to benefit economically from its extensive natural gas reserves and of Sasol and other South African companies becoming beneficial users of this gas is nearing realization....

"Sasol has a viable market for Mozambican gas, as a supplementary feedstock for its petrochemical plants at Sasolburg and Secunda, which currently rely exclusively on coal for their hydrocarbon feedstock. Being rich in methane, natural gas is a viable alternative feedstock for Sasol's Fischer-Tropsch process. Sasol has also been supplying synthetic gas to downstream markets since 1964, through its distribution pipelines, which now form a 1 500-kilometre network in the provinces of Gauteng, Mpumalanga and Kwa-Zulu Natal.

"Sasol plans to build a 925-kilometre pipeline to link the Temane fields to its South African operations. The pipeline is by far the most expensive part of the project at an estimated US$600 million. The remaining production facilities and support infrastructure are likely to entail a further investment of about US$400 million."[52]

Not only does Sasol state in the document that it found high quality natural gas in Mozambique (a process that would have begun well before 1999), that it had a use for such gas in its Sasolburg and Secunda plants, that the gas from Mozambique was a "viable alternative" to locally mined coal, that it had an external market for the gas, but also that it was planning to build the pipeline.

Sasol plant. Picture credit: Bobby Peek, groundWork

In fact, Sasol had already costed the operation and did not find it prohibitive.

In other words, Sasol's plans to build the natural gas pipeline and use that gas in its CTL plants predates the adoption of the amendments to the Kyoto Protocol in Bonn in 2001, and misses the cut-off date of 1st of January 2000.

In addition, Sasol itself states that natural gas produces a better synthetic diesel than coal; i.e. natural gas as a feedstock produces a higher quality product than coal, which is to the company's obvious benefit.[53]

Even apart from the additionality concerns, there are strong reasons to view Sasol's application for carbon credits with a cynical eye. The whole rationale behind the Kyoto Protocol is to limit and then reduce greenhouse gases. It represents the collective wisdom of 181 countries and a global attempt to curb additional heating of the planet. Sasol's conversion to natural gas at its Secunda plant will work towards that goal, but the net benefit will be dwarfed because the company's total emissions are due to rise. It plans to build at least three new coal-to-liquid plants in Indonesia, China, and South Africa. Any emissions cuts at Secunda will be quickly surpassed by rises at other Sasol operations.

Sasol will remain one of biggest corporate emitters of greenhouse gases on the planet. So, on one hand, Sasol is seeking funds under an international agreement designed to reduce global greenhouse gas emissions, while on the other hand employing a business strategy that will drastically increase its total carbon dioxide emissions.

This is contrary to the spirit of global emissions reductions, and could be seen by some as cynical gaming of the CDM system.This is not a good thing for Sasol, coming as it does on top of a probe announced in January by South Africa's Competition Commission into possible price-fixing of piped gas.[54]

CONCLUSION

If we are to address climate change, the current energy system must be reviewed with urgency. South Africa is officially committed to renewable energy targets and sustainable development through its legislation. The 15% renewable energy target by 2020 is not unrealistic. The problem however is the slow pace with which government is addressing renewable energy. The 15% target would ensure emissions reductions of around 165Mt of (CO_2 Equivalent) CO_2-eq over the period 2006 to 2020, with higher reductions of up to 400Mt if combined with energy efficient programmes as well.

This report says that the South African government must continue to press rich countries to fulfil their obligations to cut their emissions first and fastest and to help developing countries to adapt.

As Emeritus Archbishop Desmond Tutu says:
"The world's wealthiest countries have emitted more than their fair share of greenhouse gases. Resultant floods, droughts and other climate change impacts continue to fall disproportionately on the world's poorest people and countries, many of which are in Africa. Rich countries must therefore help poorer countries in two ways. They must reduce their greenhouse gas emissions so that the effects of climate change suffered by Africa's poor do not get worse. They also have an obligation to help poor countries adapt to the negative impacts of climate change, which cannot be avoided".[55]

In other words, as Oxfam argues, rich countries must stop harming and start helping.

But this report has argued that the South Africa government must take action at home too. To do so is both essential in itself and will strengthen the country's hand at the negotiating table. At home it must become serious about achieving renewable energy targets and energy efficiency, which will also bring about much-needed "green jobs". The government must impose the stricter regulatory framework that it has been promising and look seriously at how to impose a carbon tax, in order to push high-emitting corporations into genuinely reducing their GHG emissions. At the same time, government has to get serious about helping poor communities to adapt to those consequences of climate change that sadly cannot be avoided.

In the knowledge that the world only has six years in which to act to bring down greenhouse gas emissions and to simultaneously embark on the path to a future that provides cleaner energy to all citizens equitably and effectively, the following measures should be given immediate attention:

1 A moratorium on building coal-fired plants after Medupi and Bravo (i.e. from 2013).
2 An immediate moratorium on any new coal-to-liquid plants.
3 The Treasury should institute its fossil fuel levy (ZAR0.02/kWh) with immediate effect, revenue from this to be ring-fenced for Free Basic Electricity. The FBE should be in line with People's Budget proposals.[56]
4 A staggered implementation of carbon taxation, as per the LTMS.
5 The rollout of 1 million solar water heaters by 2020.
6 15% of all electricity to come from renewable energy by 2020, and 50% by 2050.
7 Make energy efficiency in RDP housing a mandatory measure by 2015.
8 Invest in an efficient public transport system.
9 Promote gardening in urban and peri-urban areas and around homesteads.
10 Increase public awareness and thus promote behavioural change among consumers.

And if all else fails, and mindful of the pleas of that DEAT official who said: *"we can't change things without the pressure of citizens"*, then South Africans need to take to the streets and demand action from government, not only on climate change but also on poverty eradication and corporate accountability.

Earthlife Africa-Johannesburg urges people to become involved in and support many of its campaigns, especially around the following key dates of action:

- Anti-CTL Day of Action 12th of October 2009: Theme: No more CTL plants!
- Global Day of Action 6th of Dec. 2009: Theme: For a pro-poor focus in the international negotiations taking place at Copenhagen!

Children playing on a trampoline in Orange Town. Climate change must be prevented for the sake of later generations. Picture credit: Kaya Ngwenya/Oxfam

41 Schaffler, J. (2008) 'Sustainable Energy Briefing Paper: Costs of Renewable Energy', produced by SECCP
42 Thomas P Fluri, University of Stellenbosch Department of Mechanical and Mechatronic Engineering, private communication, February 2009
43 Agama Energy, (2003) 'Employment Potential of Renewable Energy in South Africa', Johannesburg: The Sustainable Energy and Climate Change Partnership of Earthlife Africa
44 Ibid
45 Ibid
46 Le Roux, H. (2003) 'RDP houses lacking in energy efficiency, says company', www.engineeringnews.co.za/article
47 For more on the Kuyasa Project, the reader is referred to: SouthSouthNorth (2007) 'Kuyasa Low Cost Housing Energy Upgrade Project, Khayelitsha, South Africa' (http://reeep-sa.org/component/option,com_docman/task,doc_view/gid,23/Itemid,14/) and to: Mqadi, L. and L. Malgas, (2004) 'The Kuyasa Case Study: An effort towards climate justice and energy poverty alleviation: crediting suppressed demand for energy services under the CDM'
48 Donnelly, L. (2008) 'New Carbon Tax on its way', Johannesburg: Mail and Guardian
49 Schneider, M. (2008) 'Making savings at Sasol', http://free.financialmail.co.za/report08/green08/jgreen.htm
50 Erion, G. (2005) 'Low-Hanging Fruit Always Rots First', Centre for Civil Society
51 Ibid
52 Sasol (1999) 'Annual Report 1999', South Africa: Sasol Group Corporate Affairs Department
53 Sasol (2006) 'Oil Test Results Stun Sasol Chevron GTL Challenge Team', http://www.sasol.com/sasol_internet/frontend/navigation.jsp?articleTypeID=2&articleId=14600001&navid=4&rootid=4
54 Afp, (2009) 'S Africa opens probe into piped gas price-fixing', http://www.google.com/hostednews/afp/article/ALeqM5j1UfqUaVRJRJaZbkOxyNHYoOsJmw
55 The foreword to Africa: Up in Smoke? ibid.
56 Budgeting for surplus in the midst of poverty, inequality and unemployment, People's Budget Coalition proposals for 2009-2010 Budget, COSATU

AFTERWORD

Climate change is a major global problem that is worsening and if temperatures continue to rise at current rates, climate change threatens human development – and possibly even human survival. Poor people are already the most vulnerable to harsh and variable climates, and extremes of rainfall and temperature, shifts in growing seasons and unpredictable, sudden and violent climatic events are going to increase with temperature.

The South African government has a moral obligation to respond to the impacts and to take a lead to develop both mitigation and adaptation strategies. These strategies must not only focus on the ecological and economic aspects but more importantly on the social impacts of climate change. Climate change will increase poverty, malaria, water shortages, food insecurity, drought, floods and migration, and harm those living with HIV and AIDS. The cost of government inaction will result in an even higher price later.
Existing development policies have failed the majority of the people of South Africa. They have proven to be inadequate and ineffectual.

Business and investment have taken a front seat in terms of government priorities, and until corporations are held accountable for their emissions, the poor will continue to pay the price for the inactivity of government and companies. Finally, there has to be an increase in awareness campaigns so that the citizens of South Africa are informed and empowered to demand an end to business-as-usual. Action by the electorate and a change in the behaviour of consumers will be powerful forces in changing the behaviour of governments and of corporations alike. Earthlife believes that the time to agitate, educate and organise is now!

Successful wetlands rehabilitation at Craigieburn, an example of 'no regrets' adaptation. Picture credit: Rehana Dada, Working for Wetlands

Bibliography

Afp, (2009) 'S Africa opens probe into piped gas price-fixing', http://www.google.com/hostednews/afp/article/ALeqM5j1UfqUaVRJRJaZbkOxyNHYoOsJmw

Agama Energy, (2003) 'Employment Potential of Renewable Energy in South Africa', Johannesburg: The Sustainable Energy and Climate Change Partnership of Earthlife Africa

Baede, A.P.M. (ed) (2007) 'Glossary of Terms used in the IPCC Fourth Assessment Report', http://www.ipcc.ch/glossary/index.htm

Brody, A., J. Demetriades and E. Esplen (2008) Gender and climate change: mapping the linkages, UK: UK Department for International Development

Christian Aid (2007) 'Human Tide: the real migration crisis', http://www.christianaid.org.uk/resources/policy/climate_changes.aspx

Department of Environmental Affairs and Tourism (2004) A National Climate Change Response Strategy for South Africa, South Africa: DEAT

Department of Environmental Affairs and Tourism (2006) 'A strategic Framework for Sustainable Development in South Africa', South Africa: DEAT

Department of Environmental Affairs and Tourism (2008) 'Strategic Plan for the Environmental Sector: 2008 – 2013, South Africa: DEAT

Department of Minerals and Energy (2003) 'Electricity Basic Services Support Tariff Policy', South Africa: DME

Department of Minerals and Energy (2003) 'White Paper on Renewable Energy', South Africa: DME

Donnelly L. (2008) 'New Carbon Tax on its way', Johannesburg: Mail and Guardian

Earthlife Africa Jhb (2008) 'Press Release: Minster Van Schalkwyk's Doubletalk', http://www.earthlife.org.za/?p=206

Energy Research Centre (2007) 'Impacts, Vulnerability and Adaptation in Key South African Sectors: An input into the Long Term Mitigation Scenarios process', South Africa: University of Cape Town

Erion, G. (2005) 'Low-Hanging Fruit Always Rots First', Centre for Civil Society

Eskom (2008) 'Eskom information sheet on Climate Change', http://www.wbcsd.org/Plugins/DocSearch/details.asp?DocTypeId=25&ObjectId=Mjc0NDk

Flynn, D. (2008) 'Time to highlight the human face of climate change', http://www.mg.co.za

Friends of the Earth Australia (2004) 'The next step to the business as usual approach to saving the planet', http://www.foe.org.au/resources/publications

Gauteng Treasury (2008) 'Gauteng Socio-economic Review', Johannesburg: Gauteng Provincial government

Geffen, N. (2008) 'What do South Africa's AIDS statistics mean? A TAC briefing paper', http://www.tac.org.za/community/aidsstats

Greenpeace Australia (2006) 'Submission to the House of Representatives Standing Committee on Science and Innovation Inquiry into geosequestration technology', http://www.dpi.vic.gov.au/DPI/dpinenergy.nsf/9e58661e880ba9e44a256c640023eb2e/339793cacd755ca6ca2574ea001fa26a/$FILE/ATTSOY0E/Greenpeace%20Submission.pdf

Hallowes, D. (2008) 'A Critical Appraisal of the LTMS', Johannesburg: SECCP of Earthlife Africa

Hallowes, D. (2008) 'Capital melt down, Kyoto and civil society: A discussion paper on the Kyoto Protocol, **Carbon Trading and Civil Society**', Johannesburg: Sustainable Energy and Climate Change Partnership (SECCP) of Earthlife Africa

Hallowes, D. and V. Munnik (2007) 'Peak Poison: The elite energy crisis and environmental justice', Pietermaritzburg: Groundwork

Hansen, J. Global Warming 20 Years Later: Tipping Points Near www.columbia.edu/~jeh1/2008/TwentyYearsLater_20080623.pdf

Hendricks, L. (2005) Speech by Minister Hendricks at the Launch of Designated National Authority for Clean Development Mechanism

Hunter, L.M. (2007) 'Climate change, rural vulnerabilities, and migration', http://www.prb.org/Articles/2007/ClimateChangeinRuralAreas.aspx

Joint Ministerial Committee of the Boards of Governors of the Bank and the Fund on the Transfer of Real Resources to Developing Countries (2008) 'Development and Climate Change: A Strategic Framework for the World Bank Group'

Joseph N. (2008) 'Climate change could reclassify drought', www.iol.co.za

Joubert, L. (2008) Boiling Point – people in a changing climate, South Africa: Wits University Press

Le Roux, H. (2003) 'RDP houses lacking in energy efficiency, says company', www.engineeringnews.co.za/article

McKinley, D. (2006) 'The Making of a Myth: South Africa's Neo-Liberal Journey', http://vryeafrikaan.co.za/lees.php?id=497

McKinley, D. (2008) 'Water is life: The Anti-Privatisation Forum and the Struggle against Water Privatisation', http://www.sarpn.org.za/documents/d0000584/P531_McKinley.pdf

Metz, B., D. Ogunlade, H. de Coninck, M. Loos, and L. Meyer (eds) (2005) 'IPCC Special Report: Carbon Capture and Storage – Summary for Policymakers and Technical Summary', www.mnp.nl/ipcc/pages_media/SRCCS-final/ccsspm.pdf

Mqadi, L. and Malgas L. (2004) 'The Kuyasa Case Study: An effort towards climate justice and energy poverty alleviation: crediting suppressed demand for energy services under the CDM'

Munnik, V. (2008) 'The Gathering Storm - Climate Change Mapping in Southern Africa', unpublished report prepared for Oxfam International

Osbourne, H. (2006) 'Stern Report: The key points', http://www.guardian.co.uk/politics/2006/oct/30/economy.uk

Oxfam International (2008) 'Climate Wrongs and Human Rights: Putting people at the heart of climate-change policy', www.oxfam.org/files/bp117-climate-wrongs-and-human-rights-0809.pdf

Pearlman, J. and B. Chubby (2009) 'Defence warns of climate conflict', http://www.smh.com.au/news/environment/global-warming/defence-warns-of-climate-conflict/2009/01/06/1231004021036.html

Raworth, K. (2008) 'Oxfam International's Briefing Paper, Climate Wrongs and Human Rights', www.oxfam.org/en/policy/bp117-climate-wrongs-human-rights-0809

Salgado, I. (2007) 'Action for clean air is slow', http://www.cdproject.net/view-news-item.asp?id=154&recent=1

Sasol (1999) 'Annual Report 1999', South Africa: Sasol Group Corporate Affairs Department

Sasol (2006) 'Oil Test Results Stun Sasol Chevron GTL Challenge Team', http://www.sasol.com/sasol_internet/frontend/navigation.jsp?articleTypeID=2&articleId=14600001&navid=4&rootid=4

Sasol (2008) 'Sasol's Response to Climate Change', South Africa: Sasol

Scenario Building Team (2007) Long Term Mitigation Scenarios: Strategic options for South Africa, Department of Environmental Affairs and Tourism

Schaffler J. (2008) 'Sustainable Energy Briefing Paper: Costs of Renewable Energy', produced by SECCP

Schneider, M. (2008) 'Making savings at Sasol', http://free.financialmail.co.za/report08/green08/jgreen.htm

Science in Africa (2006) 'South Africa's greenhouse gas emissions under focus', http://www.scienceinafrica.co.za/2006/september/greenhouse.htm

Seekings, J. and N. Natrass (2006) Class, Race and inequality in South Africa, South Africa: University of KwaZulu-Natal Press

SouthSouthNorth (2007) 'Kuyasa Low Cost Housing Energy Upgrade Project, Khayelitsha, South Africa' (http://reeep-sa.org/component/option,com_docman/task,doc_view/gid,23/Itemid,14/)

Sterret, C. (2007) 'Where has all the water gone?', Oxfam News Winter edition Melbourne: Oxfam Australia.

The Worldwatch Institute (2008) 'State of the World – Innovations for a sustainable economy', www.worldwatch.org

Turpie, J., H. Winkler, R. Spalding-Fecher and G. Midgley (2002) 'Economic Impacts of Climate Change in South Africa: A Preliminary Analysis of Unmitigated Damage Costs', South Africa: University of Cape Town

Tutu, D. (2007) 'Who Cares about Climate Change?', 'Archbishop Desmond Tutu on Climate Change from an article printed in the Guardian'

Van Schalkwyk, M. (2008) 'government Outlines Vision, Strategic Direction and Framework for Climate Policy', http://www.info.gov.za/speeches/2008/08072816451001.htm

Winkler, H. (2005) 'Climate change and developing countries', South African Journal of Science 101, July/August 2005

Winkler, H. (2007) 'Energy policies for sustainable development in South Africa', Energy for Sustainable Development 11(1)

Winkler, H. and A. Marquard (2007) 'Energy Development and Climate Change: Decarbonising Growth in South Africa', Human Development Report 2007/2008

Working Group on Climate Change and Development (2005) 'Africa Up in Smoke?', Simms ,A. Reid, H. Magrath, J. www.neweconomics.org

Sustainable Energy and Climate Change Partnership (SECCP)
A project of Earthlife Africa Johannesburg
Tel: +27 11 339 3662
Fax: + 27 11 339 3270
Email: seccp@earthlife.org.za
Website: www.earthlife.org.za

First published online by Earthlife Africa
and Oxfam International February 2009.
Online ISBN: 978–1–84814–094–3

Oxfam International

Front cover: Kwa-Zulu Natal, South Africa. Rejoice Thembelihle Mthembu, carrying firewood - her family rely on wood for cooking, since they have no gas or electricity. Picture credit: Paul Weinberg/Oxfam