

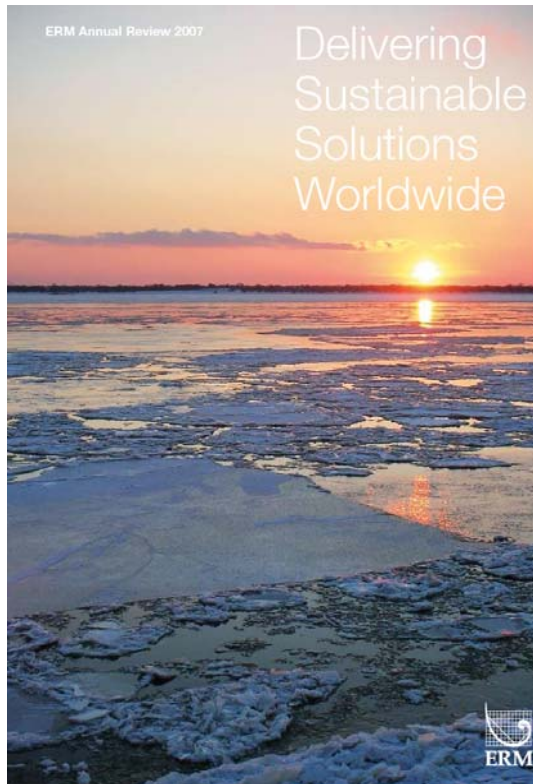
Water Institute of South Africa
Anaerobic and sludge division

Graham Paul
August 2008

Turning waste into profit – The Clean Development Mechanism



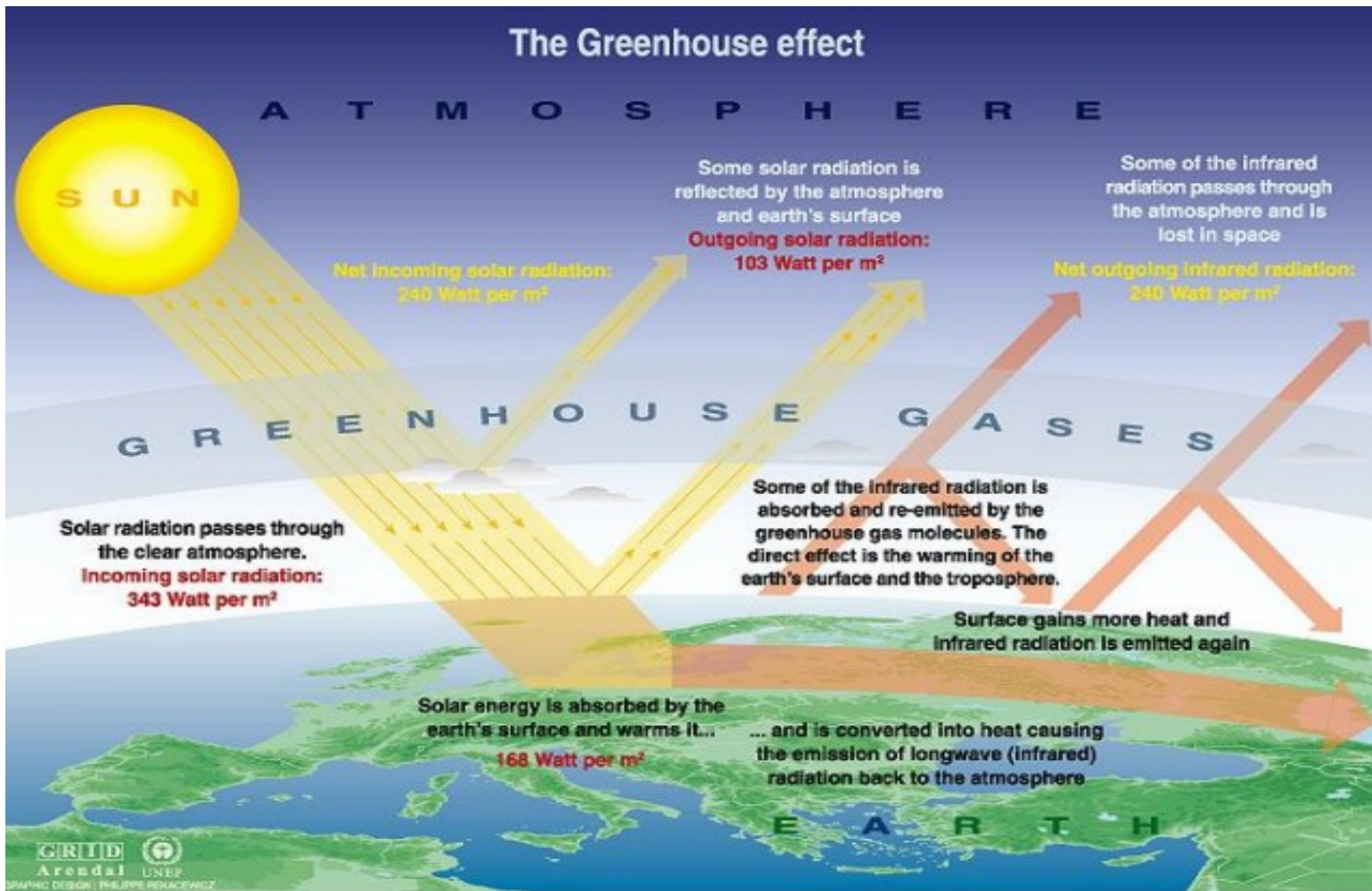
Introduction to ERM



- **The world's leading provider of environmental and sustainable development consulting services**
- **ERM delivers innovative solutions to leading business and government clients helping them to manage their environmental, and related, risks**
- **3,500 professional staff in 40 countries worldwide**
- **Over 30 years of experience**
- **Annual turnover of approx. US\$500m**



The Greenhouse Effect – what is it?



Sources: Okanagan university college in Canada, Department of geography, University of Oxford, school of geography; United States Environmental Protection Agency (EPA), Washington; Climate change 1995, The science of climate change, contribution of working group 1 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge university press, 1996.

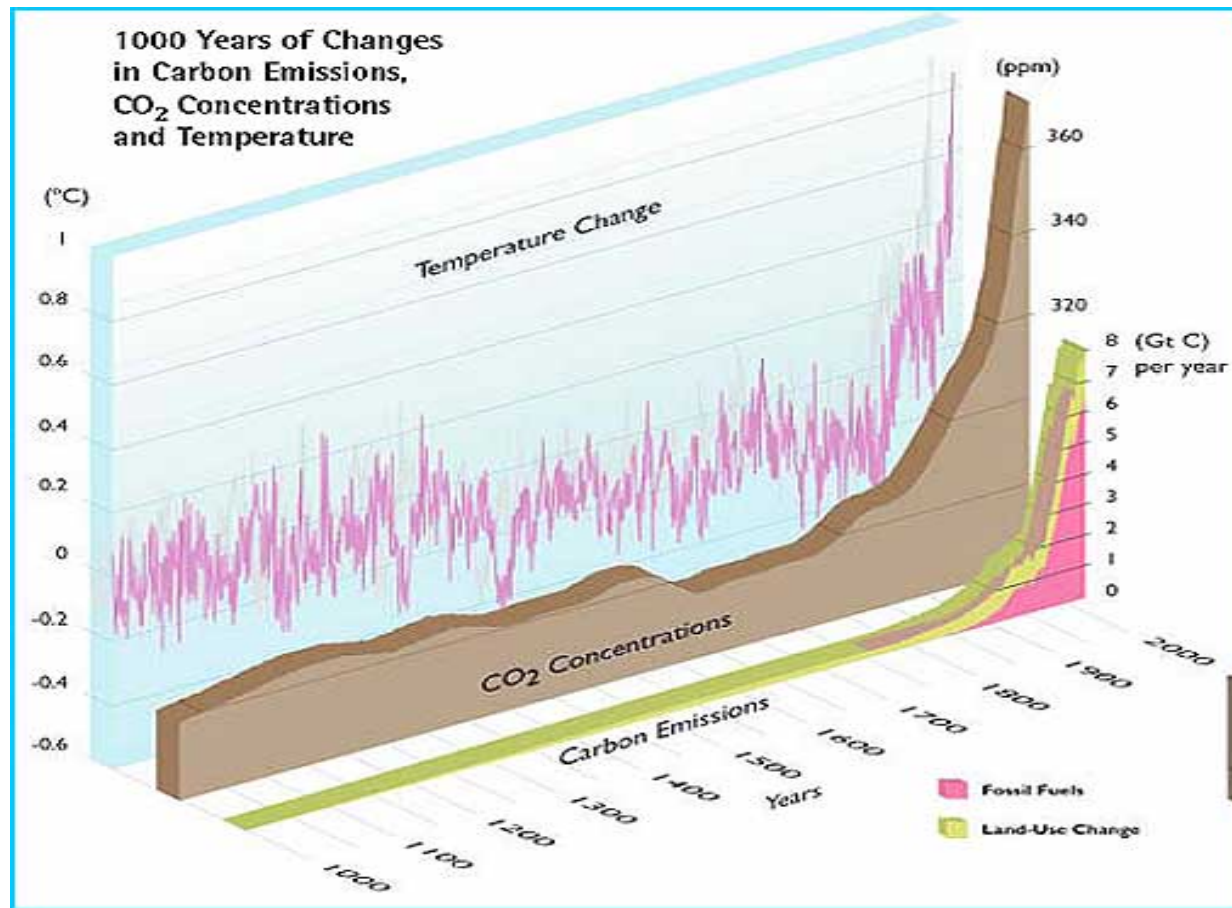


Greenhouse Gases?

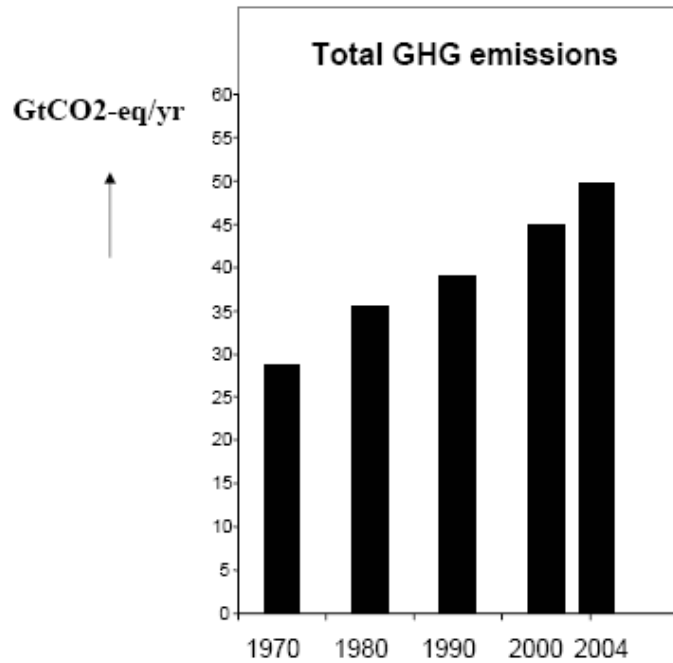
Greenhouse Gas	Global Warming Potential	Key Industrial Sources
Carbon Dioxide (CO ₂)	1	Combustion of fossil fuels; cement manufacture.
Methane (CH ₄)	23	Oil & gas extraction and processing; mining; landfills; wastewater and sludge treatment.
Nitrous Oxide (N ₂ O)	296	Adipic acid and nitric acid production; wastewater treatment; combustion processes.
Hydrofluorocarbons (HFCs) and Hydrochlorofluorocarbons (HCFCs)	140 - 11,700	Refrigerant manufacture and use.
Perfluorocarbons (PFCs)	6,500 - 9,200	Refrigerant manufacture and use; Al and Mg smelting.
Sulphur Hexafluoride (SF ₆)	23,900	Aluminium and magnesium smelting; high voltage electrical switching equipment.



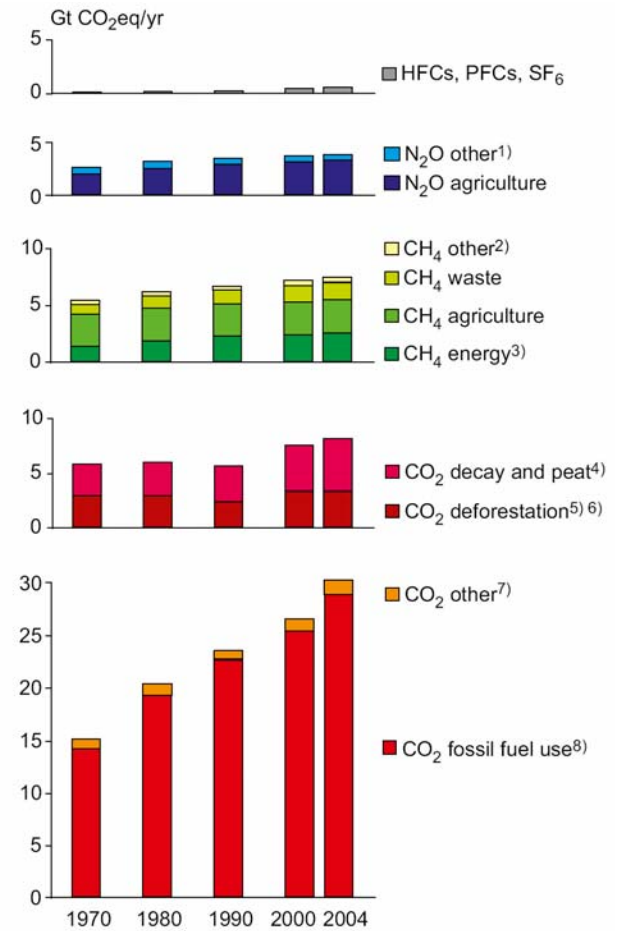
Context



Context



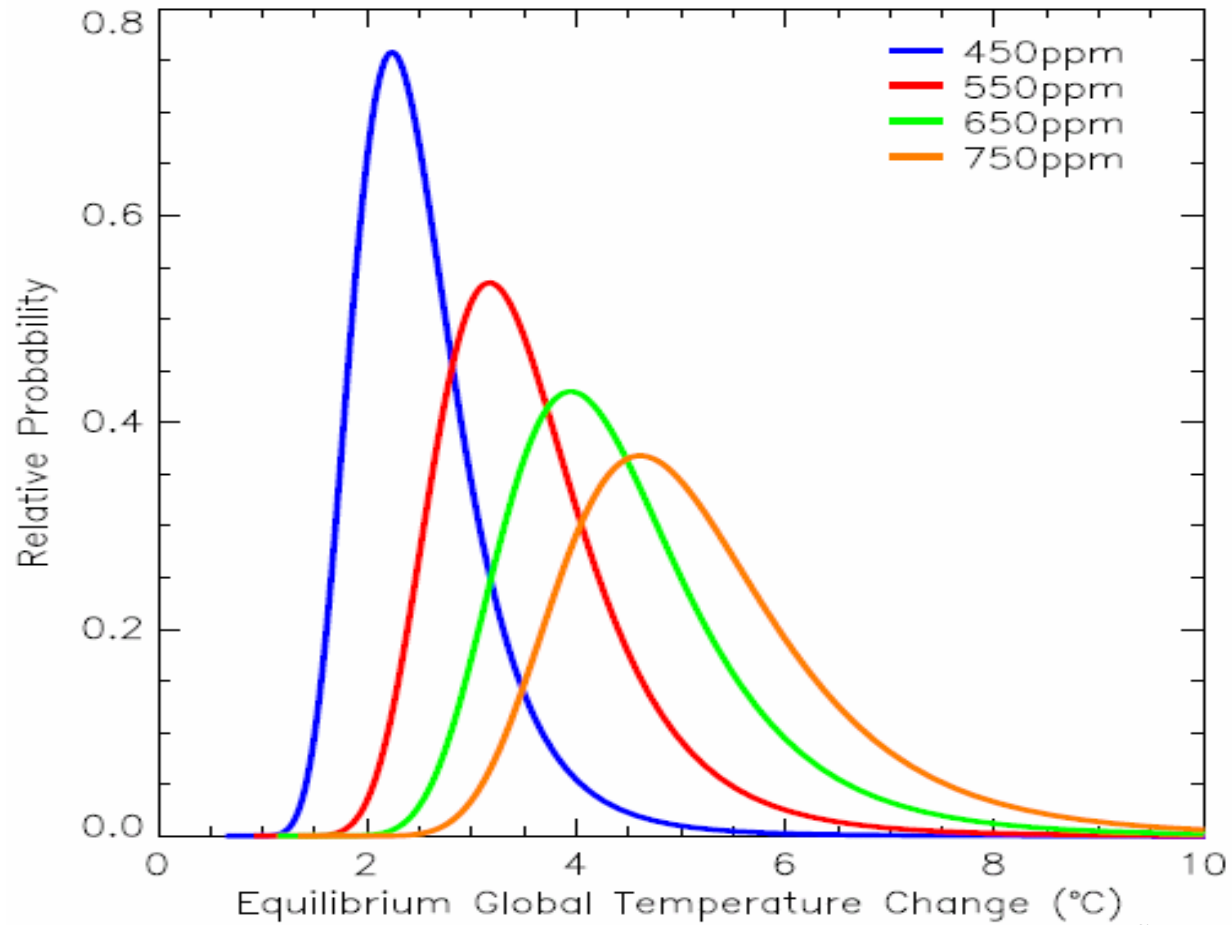
- GHG Increase of 70% since 1970
- CO₂ the largest contributor



4th IPCC Report – Sept 07



Climate sensitivity



Source: Hadley Centre



Climate Change so what?

- **Now a mainstream issue - stories about it are front page news :**
 - ◆ The Stern Review puts the economic case for urgent, early action to avert a global economic depression
 - ◆ Consumer awareness of the issue is surging
 - ◆ Evidence of physical effects that are already costing business billions is appearing e.g. Hurricane Katrina, 2003 heat wave, 2007 flooding (UK, China, India)
 - ◆ Politicians are acknowledging that 60% cuts in carbon emissions by 2050 are needed (and the scientists think this is an under-estimate)



South Africa - Climate Change regulation

- SA signatory to the Kyoto Protocol and plays a leading role in the G77+C in the Climate Change debates and had a pivotal role in getting the US to agree to the Bali Road Map in 2007
- Carbon Disclosure Project extended to JSE Top 100 in 2008
- Green Building Council of SA has adopted the Green Star Building Rating System – looking to calibrate it to SA conditions
- Long Term Mitigation Scenarios
 - ◆ outlines a range of ambitious but realistic scenarios of future climate action, notably long-term emissions scenarios and their cost implications for SA
 - ◆ Continuing along business as usual will effectively quadruple emissions by 2050
 - ◆ Substantially reducing emissions is possible, even highly desirable in some cases, and most immediate interventions are affordable



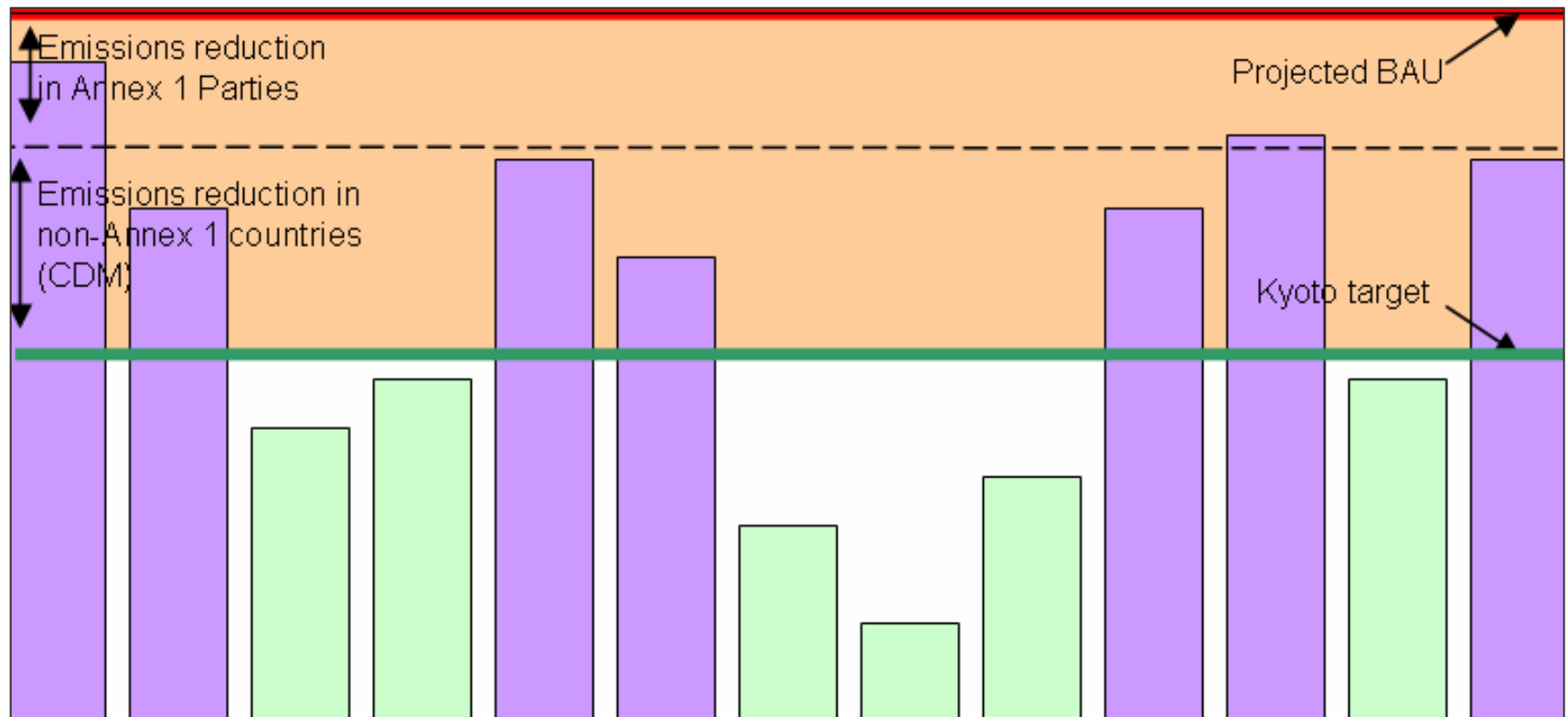
The Kyoto Protocol to UNFCCC

- Sets binding limit on the amount of GHG emissions allowed in ‘developed countries’ over 2008 – 2012
- Divides the world into
 - ◆ Annex I countries: ‘developed’, have a GHG target
 - ◆ Annex II countries: all other countries, no GHG target
- Three Kyoto mechanisms for compliance
 - ◆ International emissions trading (international market for AAUs)
 - ◆ *Project-based schemes:*
 - » Joint Implementation (JI):
 - » Clean Development Mechanism (CDM)
- International community negotiating post-Kyoto framework – binding targets for Annex I and other countries by December 2009



How Emissions Trading works

- Bars represent Annex 1 Party's emissions at the end of the first Kyoto commitment period. The green line is their emissions reduction target – purple Party's emissions are above their target so they must purchase AAUs from green Party's which have met their target and have surplus AAUs.

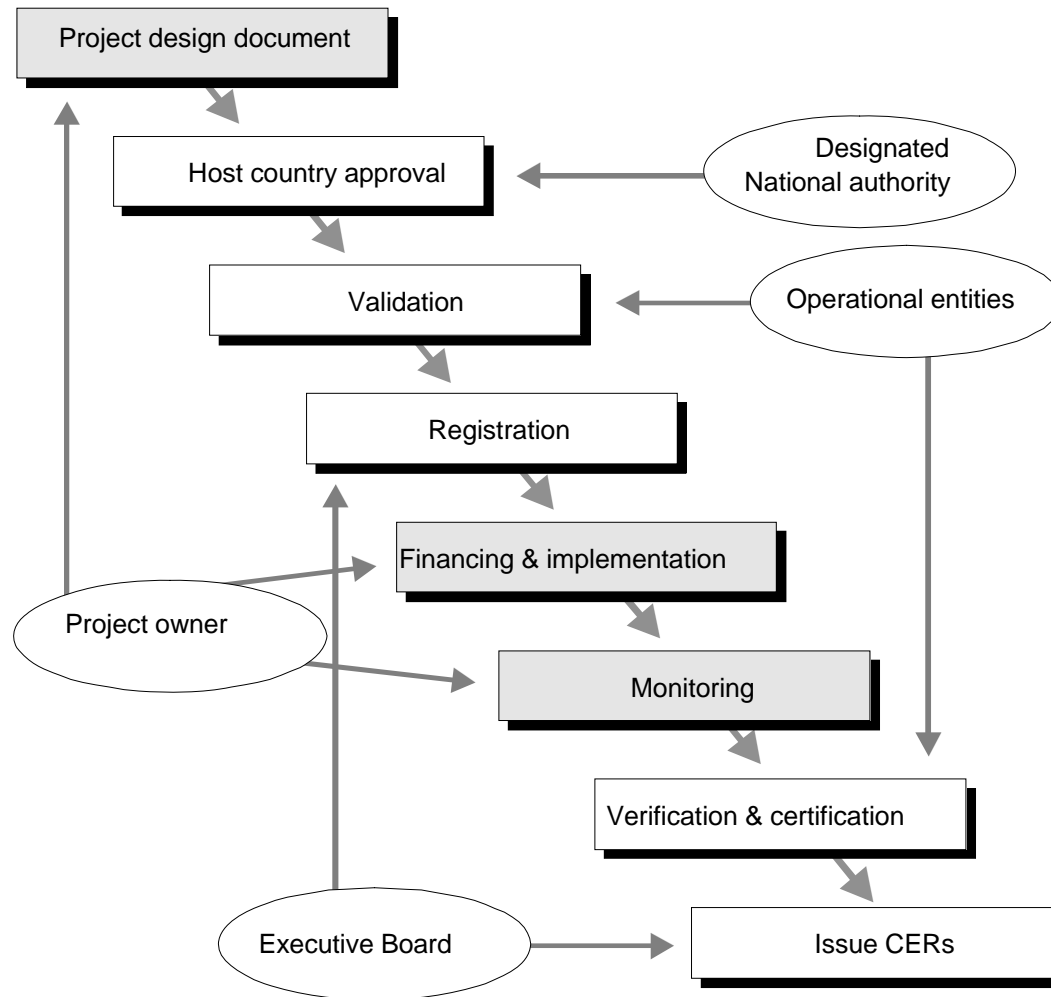


Purpose of CDM

“To assist Parties not included in Annex 1 to the convention in achieving sustainable development and in contributing to the ultimate objective of the convention, and to assist Parties included in Annex1 in achieving compliance with quantified emissions limitation reduction commitments under article 3 of the Kyoto Protocol”



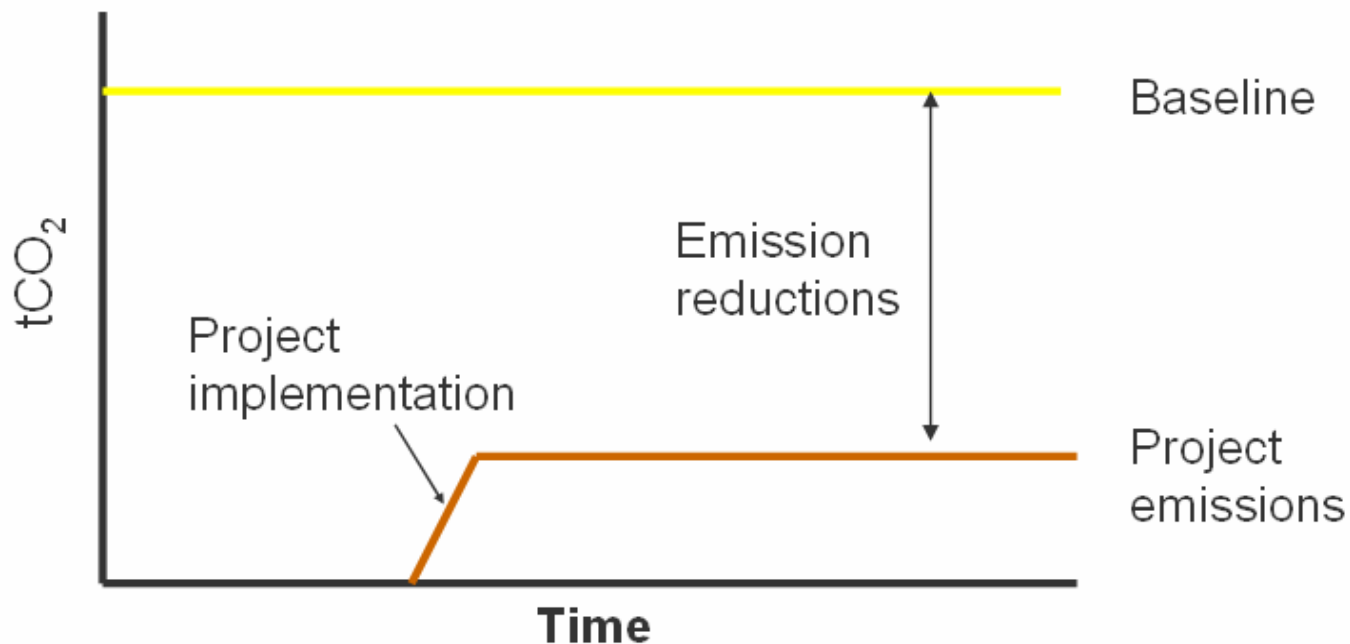
Steps in the CDM



Emissions reductions

- **Clean Development Mechanism**

- Key criteria is that emissions reductions below those that would normally have occurred in absence of project activity and would not have happened without the incentive of tradable credits (additionality)
- Others key criteria: Leakage and Sustainability

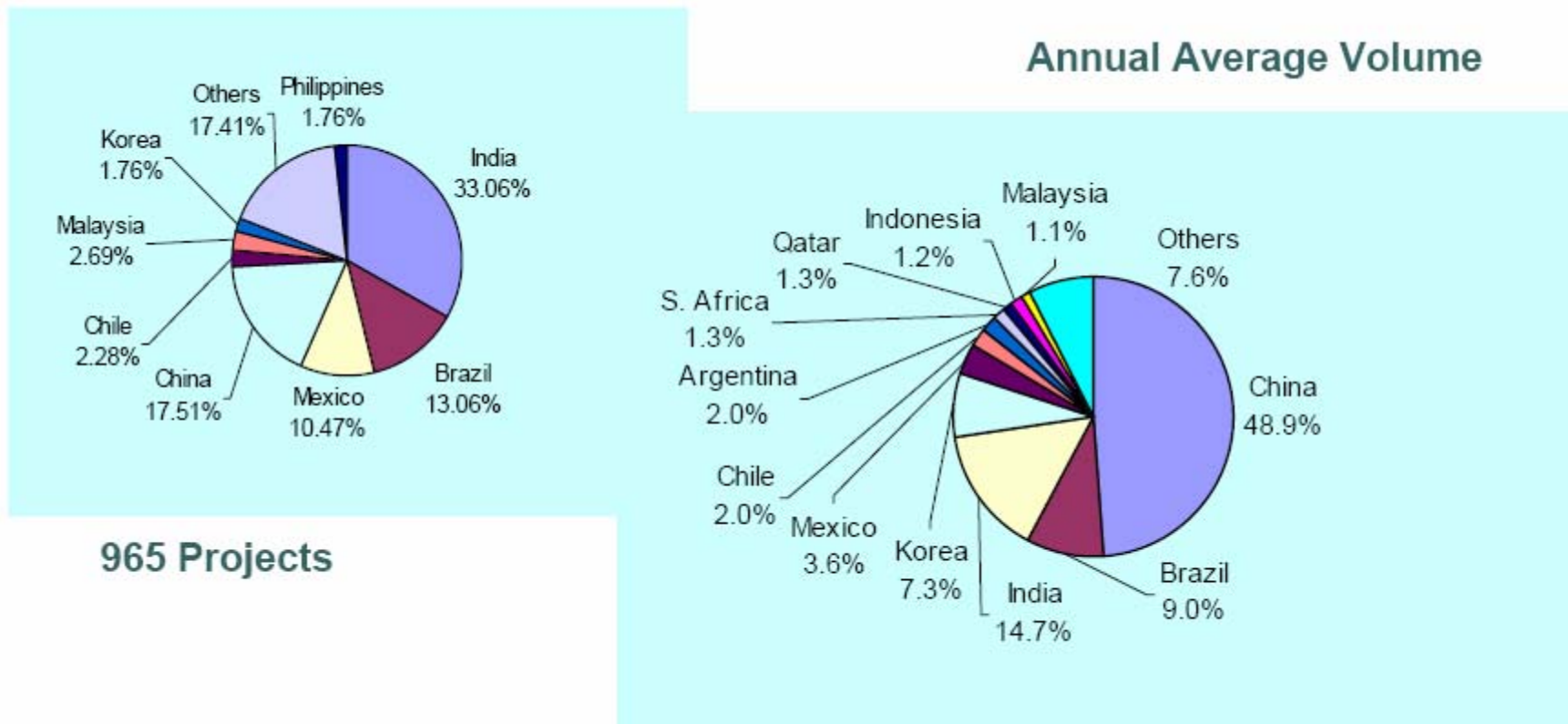


Carbon Markets in 2007

- **Carbon price on 25 August 2008: EUA's: €24.58 CERs: €20.20**
- **Global carbon markets traded 2.7GtCO₂e worth \$40 billion in 2007 – up 80% from 2006**
- **EU ETS share - 1.6GtCO₂e worth \$28 billion**
- **CDM market increased to 947MtCO₂e and \$12bn**
 - ◆ 68% increase in volume
 - ◆ 199% increase in value
- **Market for secondary trading of CDM credits (CERs) is the fastest growing segment (much related to CER-EUA swaps)**
- **Carbon prices important for investment decisions**



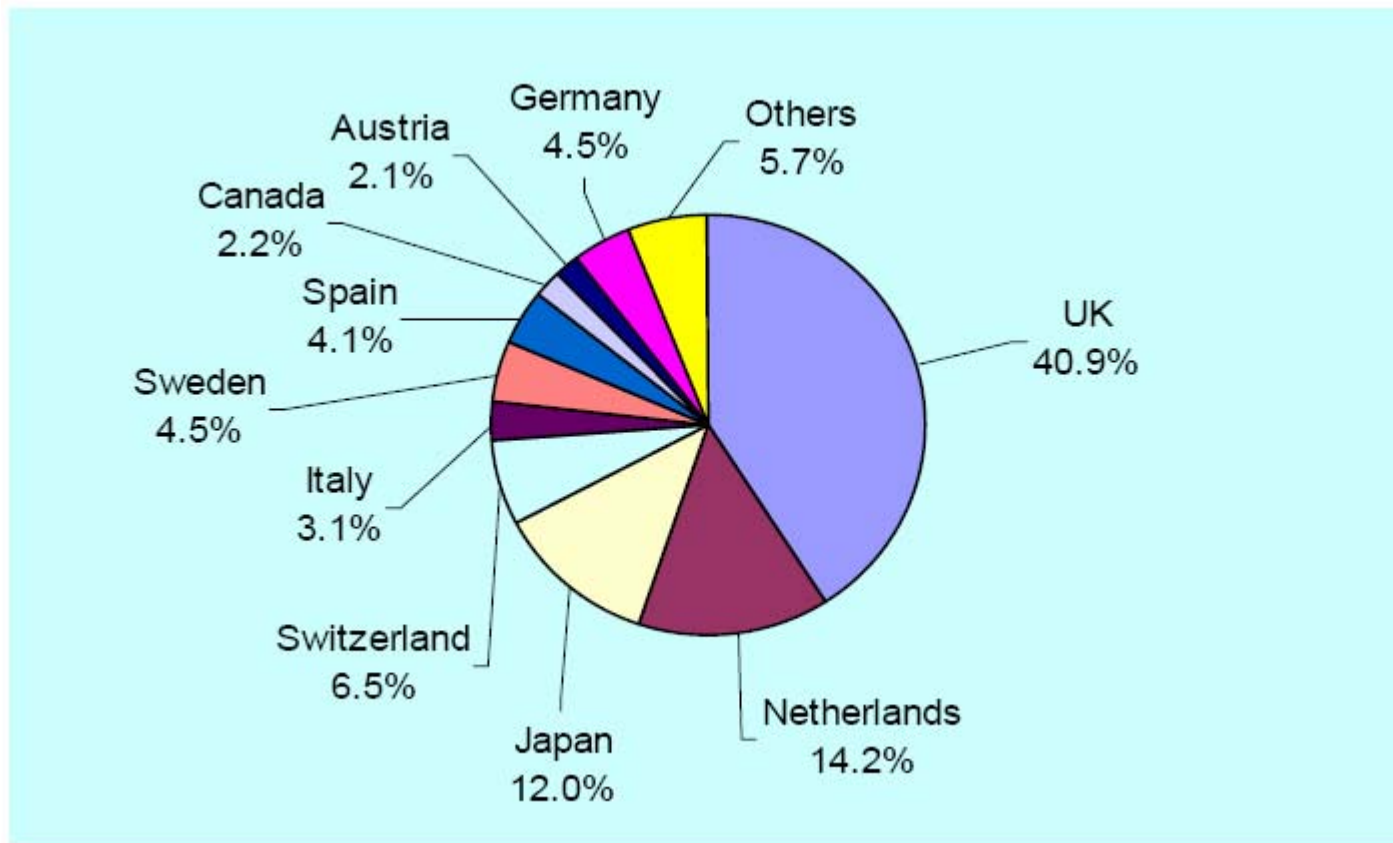
CDM Projects: Who's selling?



Source: World Bank



CDM Projects: Who's buying?



Source: World Bank



Don't forget...

- **Voluntary market**
- **Verification problems - real and verifiable reductions**
 - ◆ Gold Standard
 - » “Gold Standard offers a quality label to CDM/JI and voluntary offset projects, fetching premium prices”
 - » greater stakeholder consultation than CDM
 - » Lower transaction costs
 - ◆ Voluntary Carbon Standard
 - » “The VCS Program provides a robust, new global standard and program for approval of credible voluntary offsets”



CDM Costs

- **CDM Registration fees to EB**
 - » USD 0.10 / CER - first 15,000 ton CO₂e, and
 - » USD 0.20 / CER – excess of 15,000 ton CO₂e
 - » Max registration fee – USD 350,000
 - » No fee – average annual reductions over crediting period < 15,000 ton CO₂e
- ◆ **CDM Issuance fees**
 - » As above – registration fee deducted from SOP-Admin
 - » Among issued CERs, 2% deducted - share of proceeds to assist developing Parties vulnerable to adverse effects of climate change
- **VCS registration fee – Euro 0.04 / VCU (USD0.06 / VCU)**
- **Timelines**

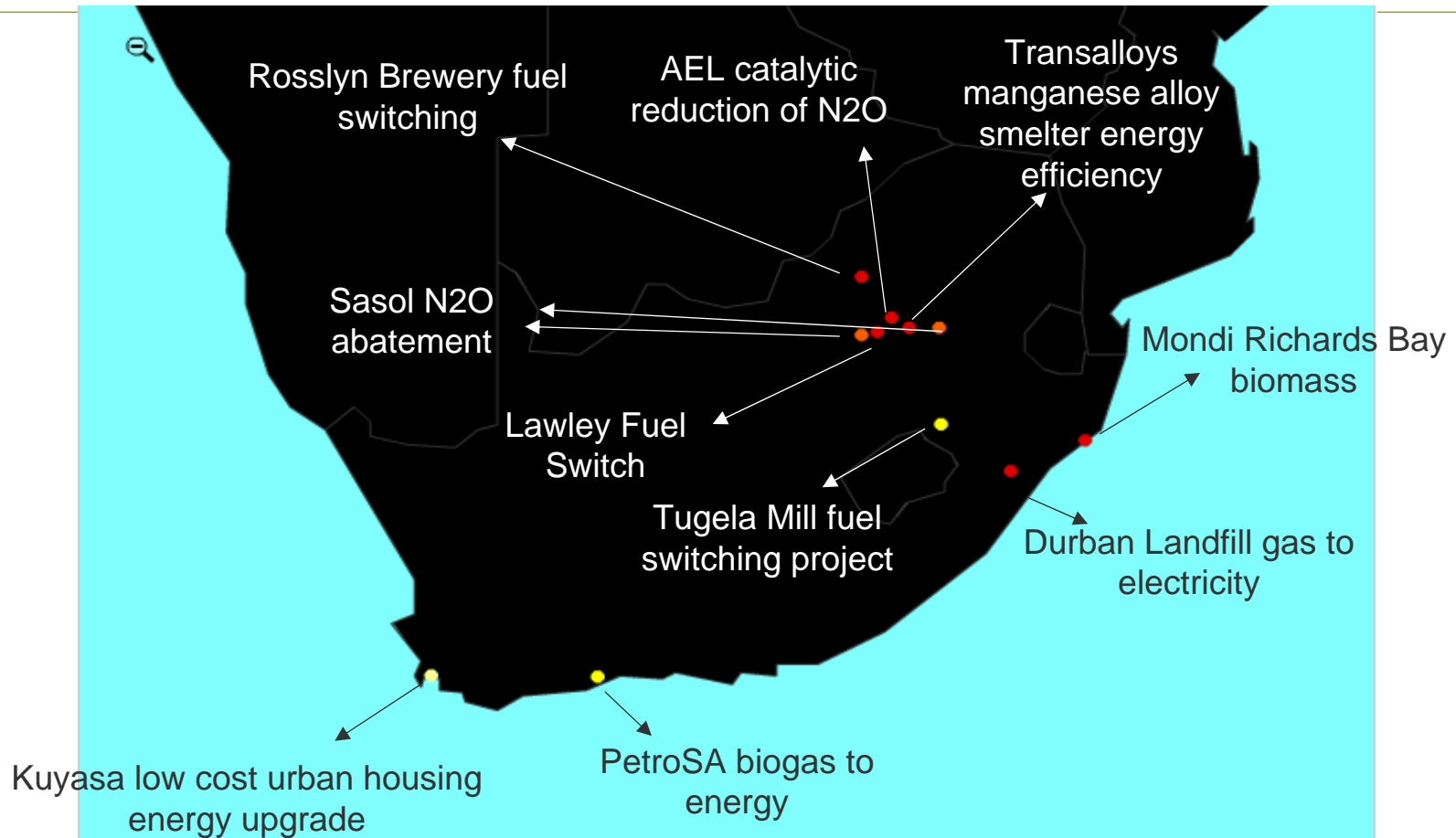


CDM in South Africa

- **Designated National Authority (DNA) established within the Department for Minerals and Energy in 2004**
- **DNA assesses potential CDM projects to determine whether they will assist South Africa in achieving its sustainable development goals and to issue formal host country approval where this is the case**
- **CDM projects in SA**
 - ◆ 13 registered
 - ◆ 12 at validation stage
 - ◆ Types: energy efficiency (households/industry), fossil fuel switch, landfill gas, biogas, biomass energy, N₂O, hydro, methane capture



CDM in SA



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

If you cannot see the map, you need to [get the latest Macromedia Flash player](#) plugin installed in your browser.

Legend

- = CDM project, Large scale, one location
- = CDM project, Large scale, several locations
- = CDM project, Small scale, one location
- = CDM project, Small scale, several locations



CDM and biogas



- **PetroSA biogas to energy project**
 - ◆ GTL plant (1987) – Duinzicht (Mossel Bay)
 - ◆ Production leads to waste process water – anaerobic digestion
 - ◆ Biogas flared – waste 1,300 GWh energy
- **CDM project produces electricity from biogas**
 - ◆ AMS-I.D. Grid connected renewable electricity generation (version 9)
 - ◆ Small scale CDM – max output capacity up to 15MW (4.2MW)
 - ◆ AMS-III.D – method dealing with CH₄ recovery (already taking place in PetroSA)
 - ◆ GE Jenbacher gas engines - 1.4MW capacity each to generate electricity



CDM and biogas

Years	Annual estimation of emission reductions in tonnes of CO ₂ e	Euros	Rands
2007	22 846	461,489.20	5,537,870.40
2008	30 461	615,312.20	7,383,746.40
2009	28 703*	579,800.60	6,957,607.20
2010	30 461	615,312.20	7,383,746.40
2011	30 461	615,312.20	7,383,746.40
2012	28 703*	579,800.60	6,957,607.20
2013	30 461	615,312.20	7,383,746.40
2014	30 461	615,312.20	7,383,746.40
2015	28 703*	579,800.60	6,957,607.20
2016	30 461	615,312.20	7,383,746.40
2017	7 615	153,823.00	1,845,876.00
Total estimated reductions (tonnes of CO₂e)	299 336	6,046,587.20	72,559,046.40
Total number of crediting years	10	10	10
Annual average over the crediting period of estimated reductions	29 933	604,658.72	7,255,904.64
	* Periodic PetroSA shut-down		



CDM and biogas

- **Ratchiburi Farm Biogas Project - Thailand**

- ◆ Swine barn flushing waste waters
- ◆ Treatment of swine barn flushing wastewaters
- ◆ Avoidance of CH₄ emissions from conventional open anaerobic lagoon system previously used
- ◆ CDM project produces electricity from biogas
- ◆ AMS-III.D – Methane recovery in agricultural and agro industrial activities
- ◆ AMS-I.D. Grid connected renewable electricity generation
- ◆ Small scale CDM – max output capacity up to 15MW (4.2MW)



CDM and biogas

Years	Annual estimation of emission reductions in tonnes of CO ₂ e	Euros	Rands
2008 (Mar – Dec)	26965	544,693.00	6,536,316.00
2009	32249	651,429.80	7,817,157.60
2010	32142	649,268.40	7,791,220.80
2011	32143	649,288.60	7,791,463.20
2012	32009	646,581.80	7,758,981.60
2013	31925	644,885.00	7,738,620.00
2014	31953	645,450.60	7,745,407.20
2015	32067	647,753.40	7,773,040.80
2016	32090	648,218.00	7,778,616.00
2017	32048	647,369.60	7,383,746.40
2018 (Jan - Feb)	5335	107,767.00	615,312.20
Total estimated reductions (tonnes of CO₂e)	320,926.00	6,482,705.20	77,792,462.40
Total number of crediting years	10	10	10
Annual average over the crediting period of estimated reductions	32,093	648,270.52	7,779,246.24



“The South African Government understands the urgency of action, and that the costs of doing nothing about climate change far out weight those of taking concrete action”

President Mbeki, Parliament, 17 May 2007

“What we need is a consolidated approach to a low carbon economy. In aiming for the ‘Required by science’ option, our emissions need to peak, plateau and decline sooner rather than later – otherwise it will become more painful and expensive”

**Minister of Environmental Affairs & Tourism, Budget Vote Speech,
20th May 2008**

"The UNFCCC ... has added impetus to the need for policy change. Options that will now come under scrutiny for implementation include the use of emission charges and tradable permits, tax incentives for cleaner production technologies and reform of the existing vehicle taxes to encourage fuel efficiency."

Trevor Manuel, March 2008 Budget Speech



Thank you

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ERM – Energy and Climate Change

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