

# Long-Term Mitigation Scenarios (LTMS) for South Africa

Jongikhaya Witi

Department of Environmental Affairs & Tourism  
Energy Research Centre, University of Cape Town

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# The Context

Climate Change is real  
and its predicted impacts for SA are serious





# Climate Change evidence & impacts

Scientific evidence for a rise in global temperature over the past century unequivocal

Climate change almost certainly driven by increased greenhouse gas concentrations caused by human activities



Climate change is already having predominantly negative impacts on people and ecosystems.

South Africa is suffering and will suffer serious impacts under global business-as-usual:

Water stress

Floods

Rainfall patterns

Spreading malaria





# The Challenge

The World has a GHG emission problem

Time is limited

We will have to act globally

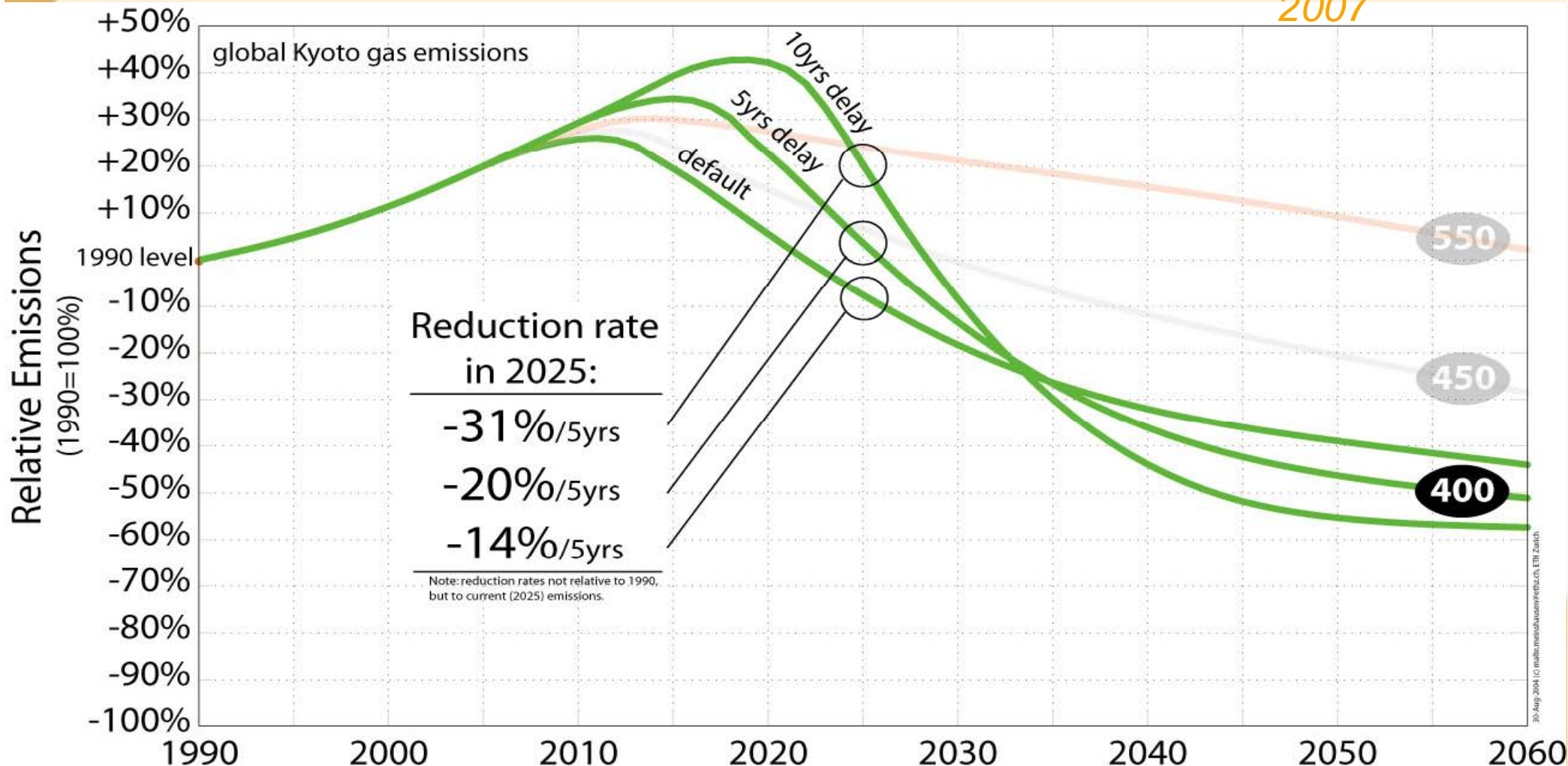
South Africa is in a unique situation





# Mitigation is urgent time to bend the curve is short

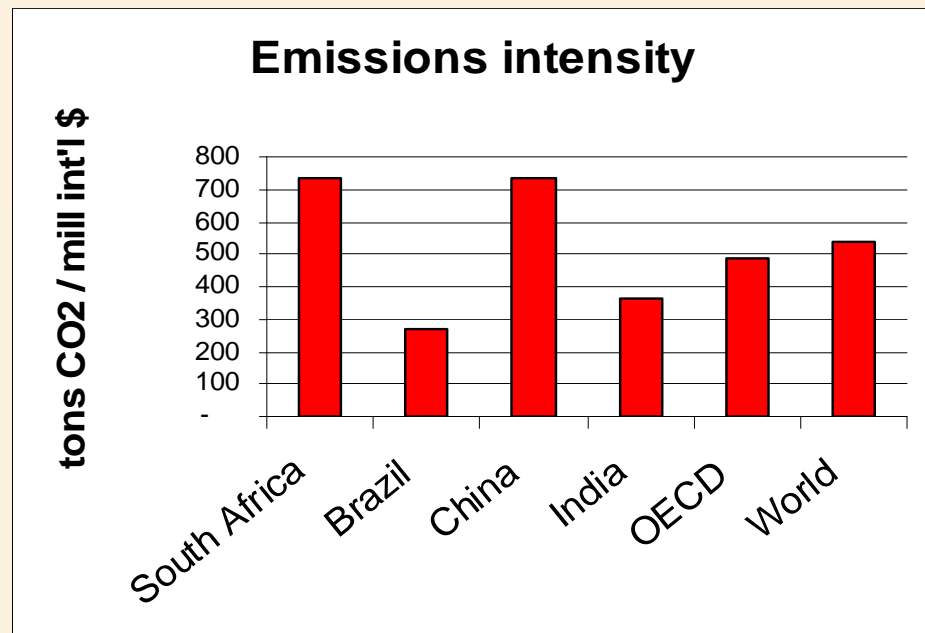
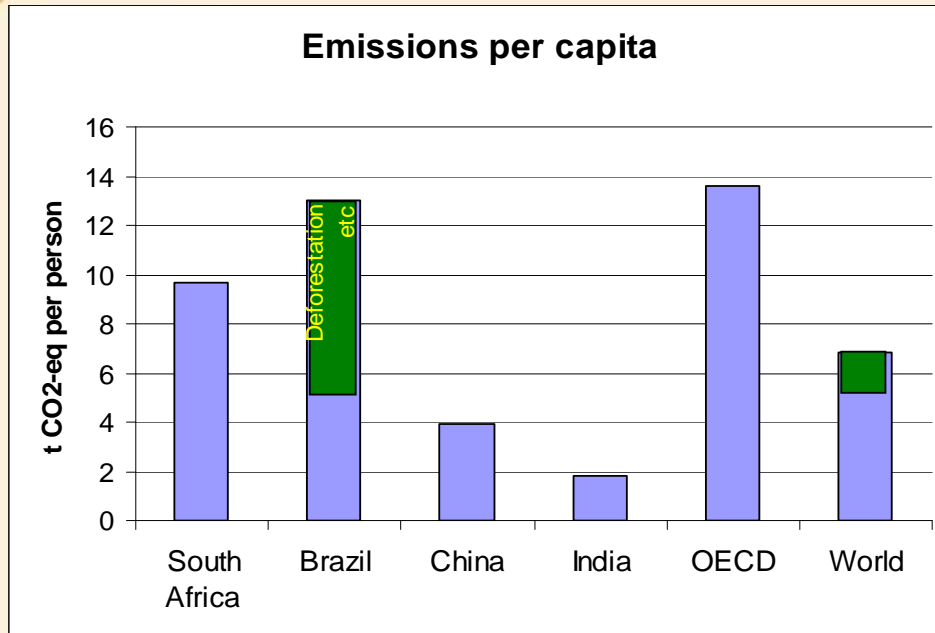
*“It is clear that delaying action on this matter of climate change will hit poor countries and communities hardest” Pres Mbeki UN GA 2007*



Note: (a) The 550Ce, 5450Ce, and 5400Ce stabilization scenarios are based on the EQW multi-gas emission pathways method, which builds on the gas-to-gas correlations within the pool of 54 SRES and Post-SRES scenarios (Meinshausen et al. submitted).  
 (b) Landuse CO2 emissions are sharply decreasing in the default scenarios. If constant CO2 emissions from the landuse sector were assumed, the emission reductions of the Kyoto-gases (fossil CO2, Methane, N2O, HFCs, PFCs, SF6) have to be more pronounced. Alternatively, if emission allowances were given to avoided landuse emissions, overall emission allowances for the Kyoto-gases would have to be reduced accordingly (solid line).  
 (c) Delay profiles were calculated by assuming a 5 or 10 delay in global action. In the illustrative default scenarios, OECD and REF regions are assumed to enter stringent emission reductions by 2010, and ASIA and ALM by 2015.



# SA compared to other countries



- Relative to the size of our population, emissions 'per capita' are high
- Emissions-intensity due to dependency on coal and inefficient use of energy
- Share of cumulative emissions lower than annual - historical responsibility works best





# LTMS

## Mandate & Objectives Scenario Building Team Products





# LTMS mandate & objectives

- LTMS is a Cabinet-mandated process for identifying scenarios for mitigation of climate change
- Led by DEAT, project managed by ERC, independent facilitation by Tokiso
- Two sets of key outputs:
  - Robust, broadly supported recommendations for a long-term national climate policy
  - Sound basis for SA negotiating position for negotiations on post-2012
- Follow up with awareness and implementation







# The work of the Scenario Building Team (SBT)

- Scenario Building Team established Aug 2006 to carry out the technical aspects
- SBT made up of strategic thinkers from government, industry, labour, civil society, as well as other relevant players
- Commissioned research teams to provide information
- 24 October 2007, after more than a year of intense work, the initial technical work of the LTMS was signed off by SBT





# LTMS products

**APPROVED** by  
all members of SBT

All technical reports  
**ACCEPTED**  
by SBT as rigorous research  
best available scientific  
information  
adequate basis to inform  
the further LTMS process

Full texts of the various  
research groups

Facilitated **PROCESS**  
with strategic thinkers from  
key stakeholder sectors

LTMS Process

A) Scenario Document

B) Technical Summary

Technical Report and Appendix

Technical Inputs:

- Energy emissions
- Non-energy emissions
- Economy – wide analysis
- Climate impacts





# Cabinet on LTMS

- Cabinet lekgotla considered LTMS outcomes (July 2008)
- Set vision, strategic direction and framework for policy directions
- Policy development process to follow





# LTMS: Process and research

Robust and broadly supported results  
achieved through technical  
methodology and extensive  
stakeholder involvement





# Management, Facilitation Team & Secretariat

- Joanne Yawitch and DEAT team (Project Manager)
- Harald Winkler (Project Lead), Pierre Mukheibir (Administration)
- Facilitators: Stefan Raubenheimer (Lead), Edwin Mohlalehi, and Pascal Moloï (High Level)
- Tokiso Secretariat: Tanya Venter, Yasmin Moola, Rachel Mosupye, Elin Lorimer





# Scenario Building Team

## Government

- DEAT Environment
- DME Minerals & Energy
- DST Science & Technology
- DoT Transport
- Treasury
- Foreign Affairs
- DTI Trade & Industry
- DPE Public Enterprises
- DWAF Water Affairs & Forestry
- Presidency
- SAWS Weather Services
- CEF / SA Nat'l Energy Research Institute
- NERSA Energy Regulator
- W Cape Province (DEADP)
- City of Johannesburg

## Business

- SASOL
- Eskom
- EIUG Energy Intensive Users Group
- Engen
- Grain SA
- Anglo Coal
- BHP Billiton
- Chamber of Mines
- Aluminium – AFSA
- Kumba Resources
- Chemical – CAIA
- Engen
- Forestry SA
- AgriSA
- Business Unity SA
- Sappi

## Civil society

- EcoCity/CURES
- Groundwork
- SESSA
- Labour (NUM)
- SEA
- SACAN
- COSATU
- SALGA
- WWF-SA
- Earthlife Africa





# Four research teams and inputs from stakeholder experts

- **Energy Emissions (led by ERC modeling)**
  - **Alison Hughes, Mary Haw, Harald Winkler, Andrew Marquard, Bruno Merven**
  - Markal model reviewed by Stephen Pye (AEAT, UK)
  - Expert input from stakeholders: Sonwabo Damba (Eskom); Energy Efficiency Technical Committee special meeting: Ian Langridge (Anglo American), Valerie Geen, Tsvetana Mateva, Hermien vd Walt (all three National Business Initiative); Chesney Bradshaw (ABB); Barry Bredenkamp (Nat'l Energy Efficiency Agency); Burt Buissine (British American Tobacco); Rochelle Chetty Sonwabo Damba, (both Eskom); LJ Grobler (NW University); Chris Teffo (Chamber of Mines); Alan Munn (Engen); Egmont Otterman (PPCement); Nico Smith (Mittal Steel); Neal Smither (BP); Theresa Maree (Eon)
- **Non-Energy Emissions (led by CSIR)**
  - **Rina Taviv, Marna van der Merwe, Bob Scholes and Gill Collet**
  - Industrial process emissions: G Kornelius (Airshed), A Marquard and H Winkler
  - Expert input from stakeholders: Linda Godfrey (NRE CSIR), Antony Phiri (NRE CSIR), Harma Greben (NRE CSIR), Susanne Dittke (EnviroSense CC), Saliem Haider (City of Cape Town) and Stan Jewaskiewitz (Envitech Solutions); John Scotcher ForestLore Consulting, Howick and Johan Bester from the DWAF. Johan Claasen from NDA, Pietman Botha from GrainSA, Sylvester Mpandeli and Matiga Motsepe from the ARC, Koos van Zyl and Nic Opperman from AgriSA; Guy F Midgley from SANBI and Brian van Wilgen from CSIR.
- **Economy-wide research (led by UCT economics)**
  - **Kalie Pauw, with Celeste Coetzee**
  - Reviewed by Dirk van Seventer (TIPS)
  - 2 special meetings of economists: Roger Baxter (Chamber of Mines). Raymond Parsons (Nedlac); Theo van Rensburg, Louise Du Plessis, Marna Kearney (all three National Treasury); Ashraf Kariem (Presidency); Stephen Gelb (Edge Institute); Michael McClintock (Sasol); James Blygnaut (University of Pretoria); Simi Siwisi BUSA
- **Climate Change Impacts (led by SANBI)**
  - **G Midgley, with Pierre Mukheibir**
  - Expert authors: R Chapman, P Mukheibir, M Tadross, B Hewitson, S Wand, R Schulze, T Lumsden, M Horan, M Warburton, B Kgope, B Mantlana, A Knowles, A Abayomi, G Ziervogel, R Cullis and A Theron





# The Gap

Two Scenarios presented by the SBT  
frame the choices for South Africa

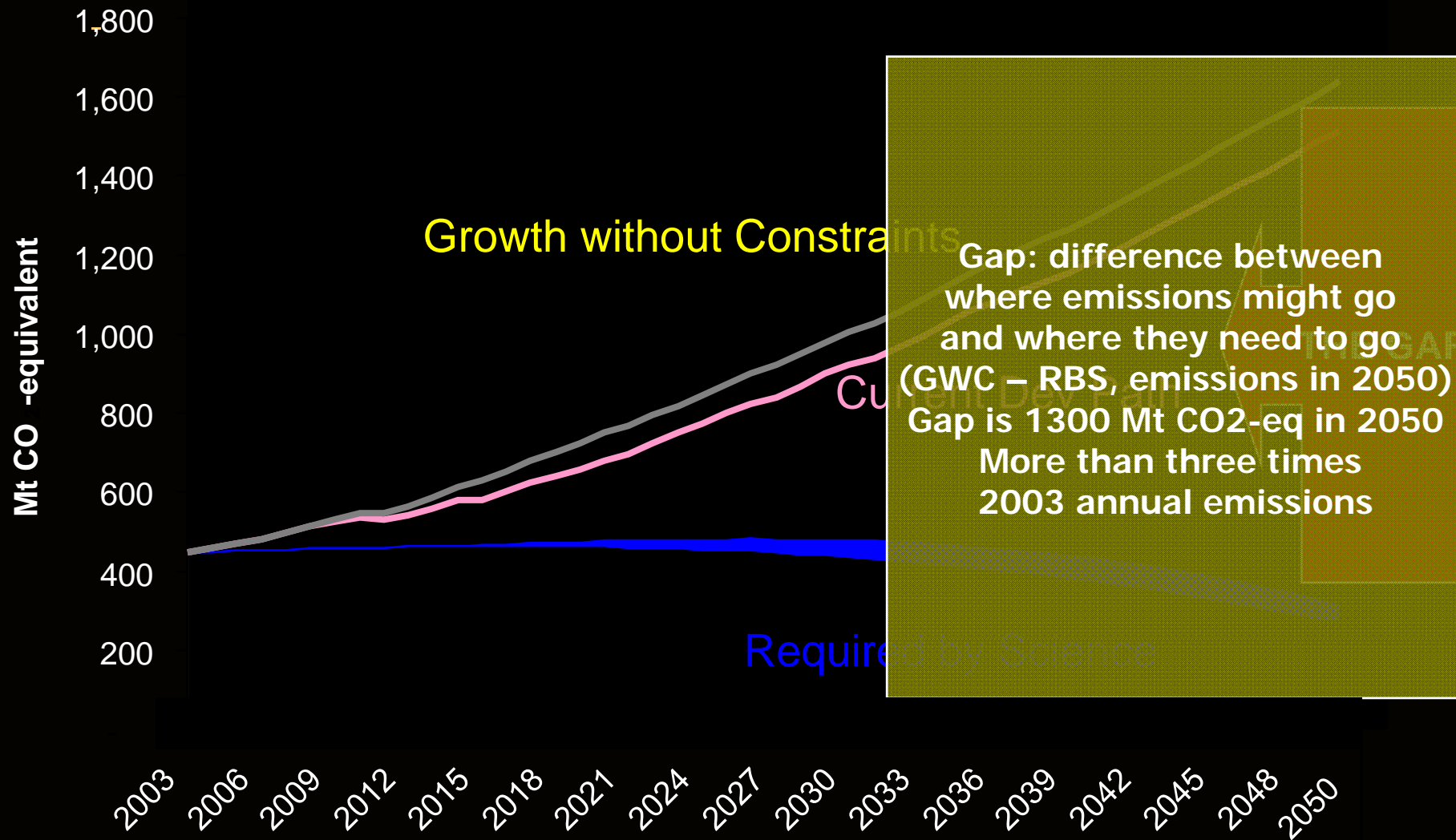






# Two Scenarios:

## Growth without Constraints and Required by Science

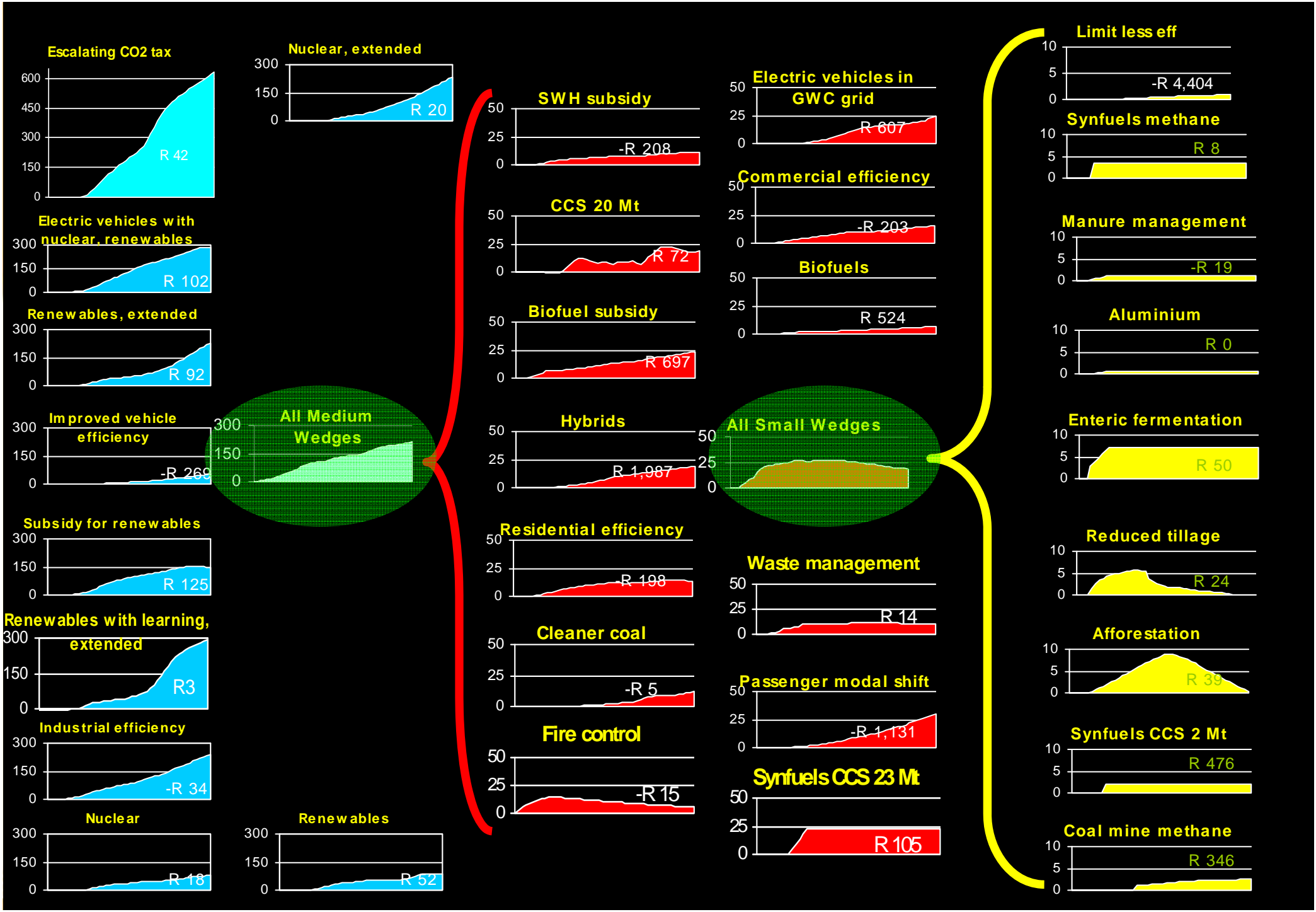




# The Technical Options

Wedges = Individual Mitigation Actions  
Showing Emission Reductions  
& Costs (and savings)







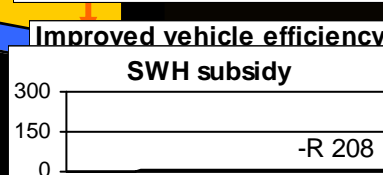
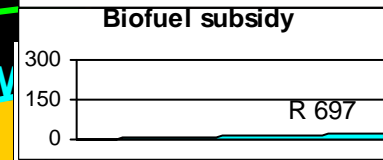
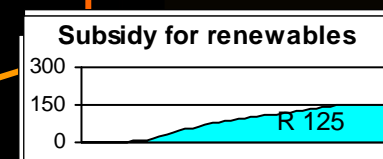
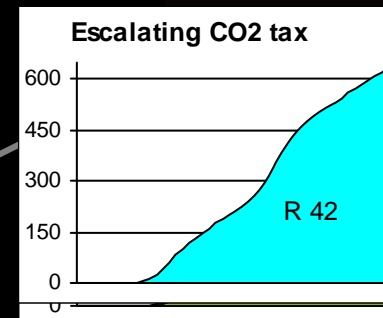
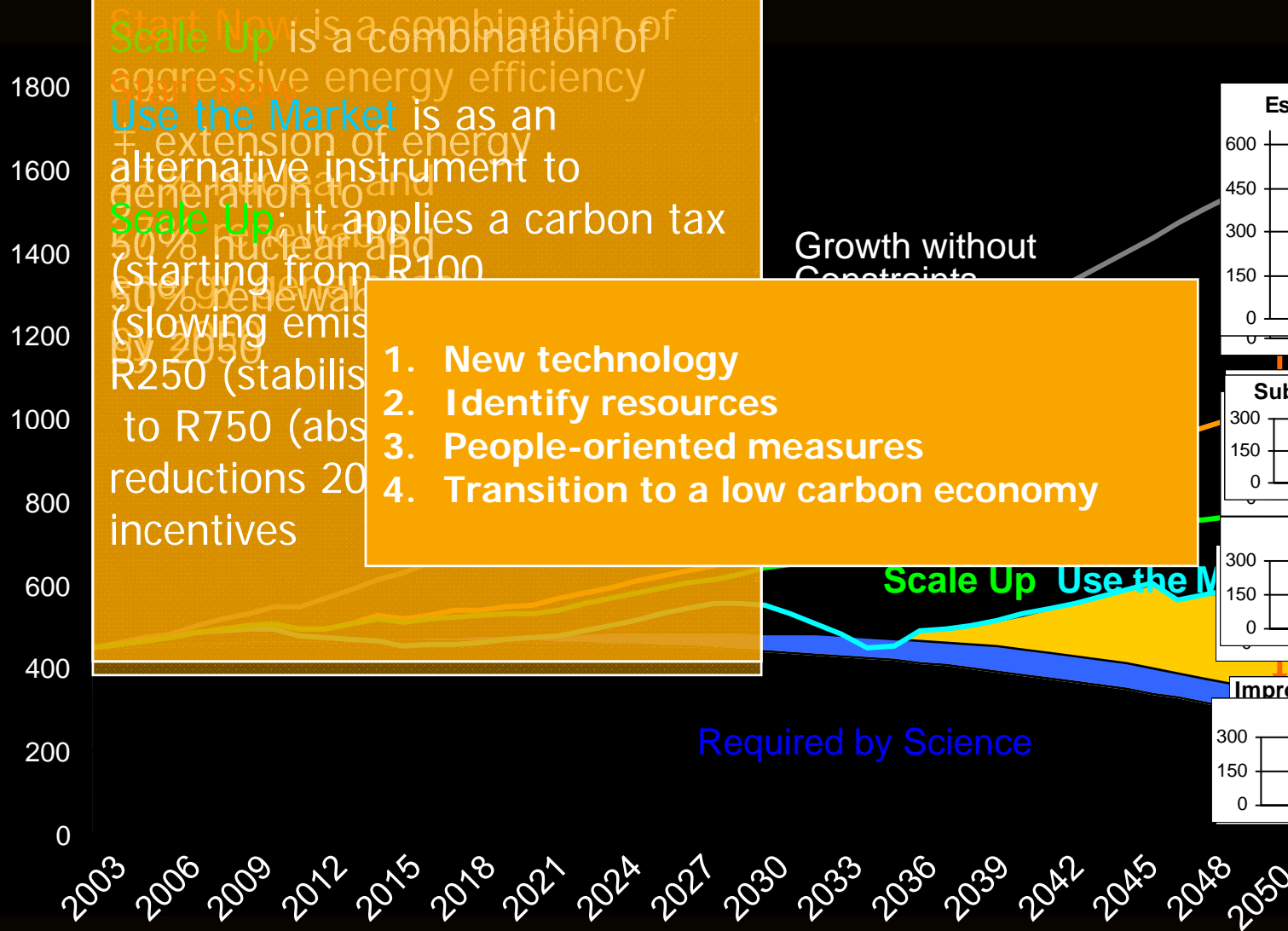
# Strategic Options

Four packages of actions  
to get from GWC  
towards the goal of  
Required by Science





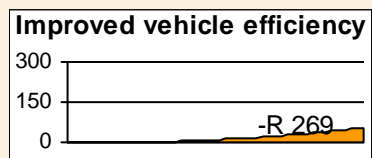
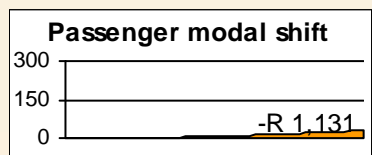
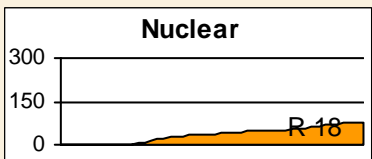
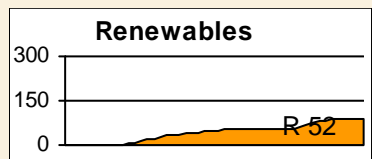
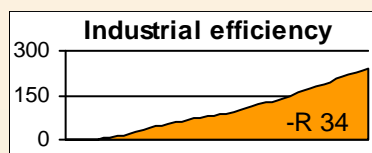
# Four Strategic Options



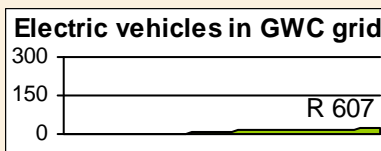
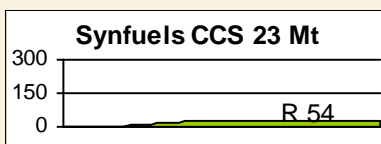
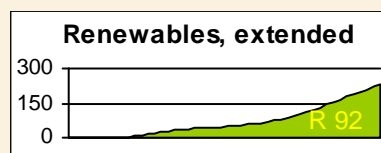
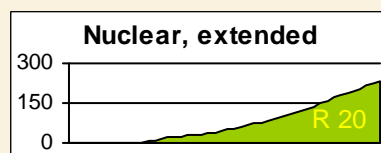
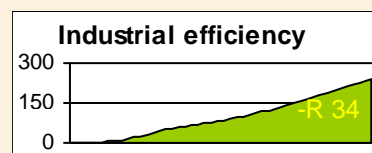


# Key steps by Strategic Option

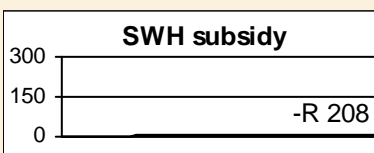
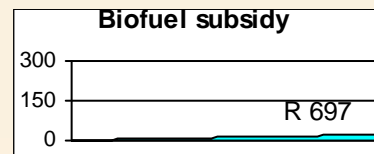
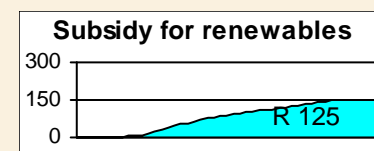
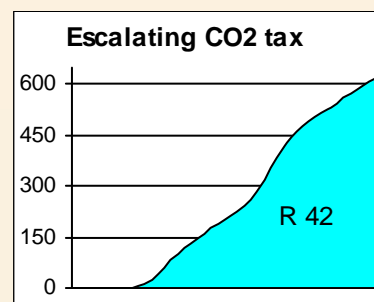
## Start Now



## Scale Up



## Use the Market



## Reach for the Goal

- New technology
- Identify resources
- People-oriented measures
- Transition to low carbon economy





# Costs

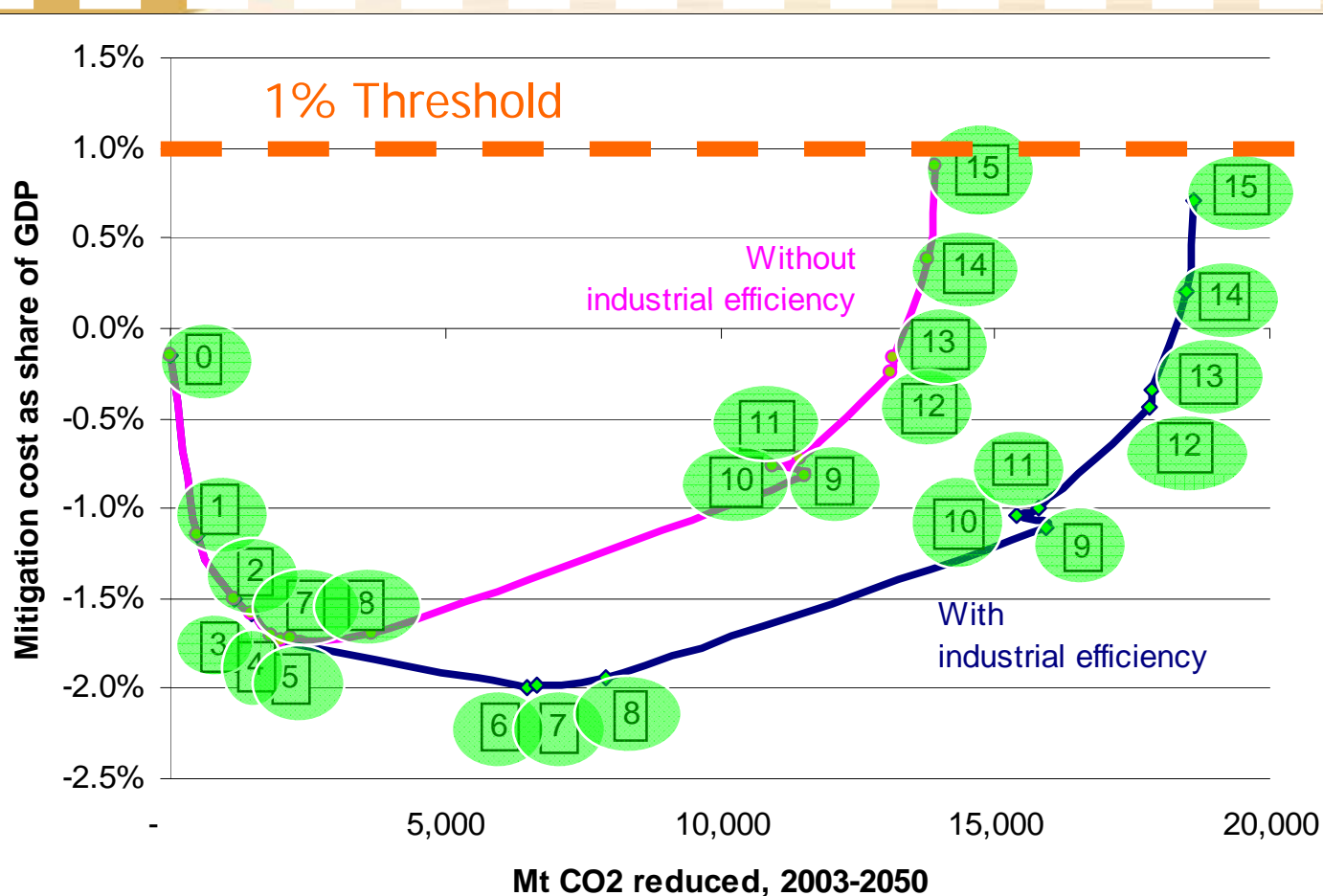
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# Economy-wide implications





# Total mitigation costs in relation to the size of the economy



- 0 Limit on low-efficiency vehicles
- 1 + Passenger modal shift
- 2 + Improved vehicle efficiency
- 3 + SWH subsidy
- 4 + Commercial efficiency
- 5 + Residential efficiency
- 6 + Industrial efficiency
- 7 + Cleaner coal
- 8 + Nuclear
- 9 + Escalating CO2 tax
- 10 + Renewables
- 11 + CCS 20 Mt
- 12 + Subsidy for renewables
- 13 + Biofuels
- 14 + Electric vehicles in GWC grid
- 15 + Hybrids

Mitigation costs as share of GDP, for runs of combined wedges each time adding another as in list at right





# Economy Wide Impacts

	<i>Impact on GDP</i>	<i>Employment (change in jobs)</i>	<i>Impact on poverty (change in income distribution)</i>
<b>Start Now</b>	+0.2% in 2015	2% in 2015 Jobs slightly below that of the reference case. Not large, but <i>any</i> job loss is of concern and would have to be off-set Lowest figure is -2.5% for semi-skilled workers in 2010	household welfare rises 3% on average
<b>Scale Up</b>	+1% in 2015	Overall 1% improvement in 2015 Semi-skilled jobs peak at 3% in 2015	
<b>Use the Market</b>	-2 % 2015 Negative effect on economy, unless off-set by other measures	Jobs <i>increase</i> for lower-skilled (+3% semi-skilled, 0% for unskilled in 2015) <i>Decrease</i> for higher-skilled workers (-2% for skilled and -4% for highly skilled)	Overall, negative welfare effects, except poorer households 0%





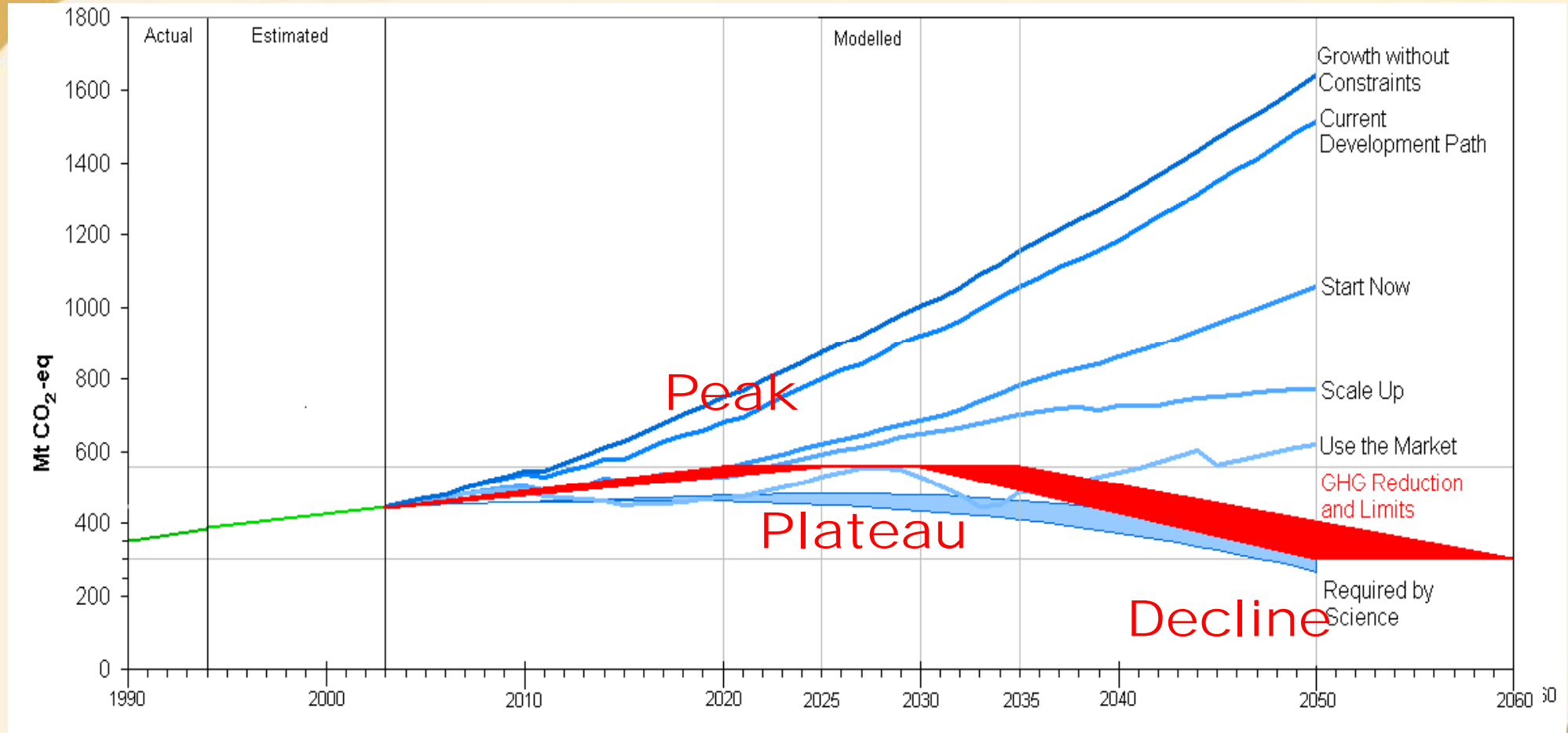
# POLICY DIRECTIONS

- The feedback from the LTMS high-level process, taken with Cabinet's direction and a policy alignment analysis, has been translated into **6 broad policy direction themes**.
  - Theme 1: Greenhouse gas emission reductions and limits
  - Theme 2: Build on, strengthen and/or scale up current initiatives
  - Theme 3: Implementing the "Business Unusual" Call for Action
  - Theme 4: Preparing for the future
  - Theme 5: Vulnerability and Adaptation
  - Theme 6: Alignment, Coordination and Cooperation





# Theme 1: GHG emission reductions and limits (Cont.)



# Thank you

For additional information visit  
www.environment.gov.za: go to Hot Issues, wait for LTMS

<http://www.environment.gov.za/HotIssues/2008/LTMS/A%20LTMS%20Scenarios%20for%20SA.pdf>