

GGBP Case Study Series

Long Term Mitigation Scenarios: Opportunities and Costs of Reducing Greenhouse Gas Emissions in South Africa

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Country: [South Africa](#)

Sector(s): [Cross-cutting](#)

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In 2006 the Government of South Africa undertook one of the earliest processes in the developing world to examine the opportunities and costs of carbon emission reductions. The Long Term Mitigation Scenarios process provided a rigorous underpinning for debate about South Africa's future development. The process sought not only to improve the state of evidence and understanding, but also to involve stakeholders in the creation and organization of this information, to begin the process of change.

Context

In 2006 the Government of South Africa took the bold step of commissioning a set of scenarios on climate change action. At the time there was no imperative on South Africa to consider mitigation, but its high per capita emission levels and water stressed vulnerability

were identified as potential risks, and there was appetite to consider whether and how South Africa could show leadership by example (Winkler, 2010). As befits a new democracy built on negotiation and a culture of inclusion, the process was innovative in its openness.

The objectives of the Long Term Mitigation

Scenarios (LTMS) were for South African stakeholders to understand realistic future scenarios for climate action based on the best available information, to enable the country to develop clear positions for international negotiations and to support the development of a long-term climate policy.

Approach

Leadership

The Ministry of Environment was the key champion in a development process involving a number of key thinkers. The government determined to carry out the study in order to lay the basis for a national climate policy and a well-supported negotiating position. The Cabinet gave a high-level mandate to the Department of Environmental Affairs and Tourism to lead the process, steered by a three-ministry committee. The simplicity of the initial instruction, and how much risk the government was prepared to take to include everyone in the study, is striking.

Stakeholders

The Ministry appointed a facilitator to manage stakeholder engagement using mediation and scenario techniques. A scenario building team (SBT) was built from around 80 people from different sectors and interest groups, including 35 individuals from government, 19 from industry, seven from civil society, and two from labor, as well as academics and consultants (Hallowes, 2008). Participants agreed to maintain confidentiality as a condition of their participation. These scenario builders served in their personal capacity at the request of the Minister and contributed sector knowledge (Raubenheimer, 2011). Records were kept confidential during that time on the grounds

that the process should not be politicized ahead of Cabinet's review of it. The LTMS process itself was similarly free of political pressures and remained semisecret (Hallowes, 2008). The SBT drove the analysis by commissioning research, identifying quantifiable mitigation actions, and debating and agreeing the inputs and assumptions used in the models.

Evidence

The Energy Research Centre (ERC) of the University of Cape Town managed the research process. At the time there was little experience of analyzing national mitigation options. But it was recognized that what was needed was a process to accumulate information, analyze it in a consultative way, and present the results in a way that would be helpful in building policy (Raubenheimer, 2007). The ERC established a broad technical research team made up of around 30 researchers from different institutions to provide the best available scientific information on energy, industrial, and land-related emissions, and on economy-wide impacts and adaptation. The research teams gathered large amounts of data to conduct modeling and assessments (Winkler, 2010).

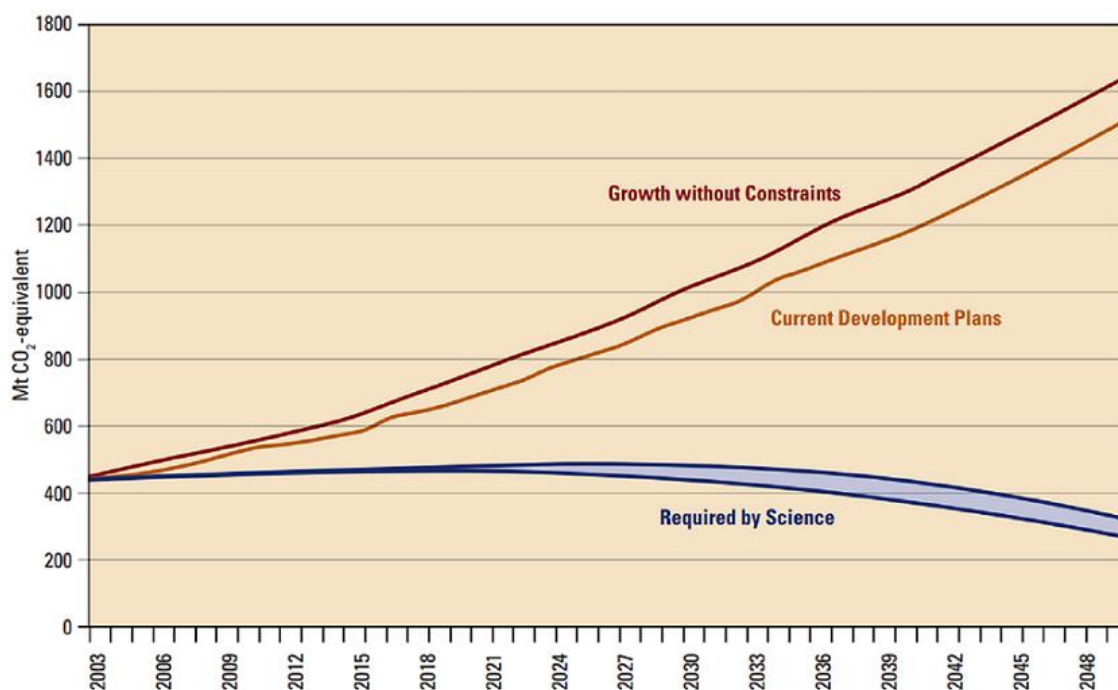
Analysis

The LTMS process was modeled using the bottom-up technology-rich optimization model MARKAL, which projects the demand for energy services based on sectoral activity, and translates this into final energy consumption using technology assumptions. The final energy demand of each sector is a model output. This created top and bottom emission levels up to 2050 with 2003 as the baseline year. One scenario is Growth Without Constraints (GWC); this is the 'no action' scenario and it projects that greenhouse gas emission levels will rise dramatically, that is, four times higher by 2050 than they were in 2003. The other scenario is Required by Science (RBS), which is

driven by a climate target or goal based on a global burden-sharing estimate. Emission mitigation opportunities were identified and quantified using the Pacala-Socolow stabilization wedges methodology, using 10 large, 13 medium-sized, and nine small technological and economic policy instrument ‘wedges’ to reduce emissions between 2010 and 2050. There were four large wedges relating to renewables, an

escalating carbon dioxide tax, electric vehicles using nuclear and renewable energy to charge the batteries, two nuclear wedges, vehicle efficiency and industrial efficiency. The research team used macroeconomic modeling to estimate costs of climate change mitigation interventions and their impacts on the economy and job creation.

Figure 1. The gap in emission levels between the Growth Without Constraints (GWC) and Required by Science (RBS) scenarios



*Source: Scenario Building Team (2007)

The LTMS process design centered around the two ‘outer’ GWC and RBS scenarios. After these were produced, the stakeholders were confronted by the large gap between them (see Figure 1, above). To address this large gap, the scenarios team identified technology, market and policy actions which could be precipitated by the state. These individual wedges were assessed for costs, emission reductions and economy-wide impacts and then combined into a series of progressively more ambitious clusters of actions, asking ‘what If’ questions

about South Africa’s level of ambition. The ‘Start Now’ option represented zero cost actions while ‘Scale Up’ was more ambitious. ‘Use the Market’ was a carbon tax-driven option, while ‘Reach for the Goal’ was more ambitious, requiring technology innovation and behavior change. The analysis highlighted that there are many mitigation actions that require upfront investment but which generate savings over time. Many are immediately implementable, although they require significant effort; these include energy efficiency, electricity

supply options, and transport shifts. Some of the mitigation actions highlighted have net public benefits, such as savings in energy bills and increased employment (SBT, 2007).

Institutionalization

LTMS was a stand-alone study, rather than part of a broader planning process. This was perhaps the weakness of LTMS: it was a study that, when complete, established no long-lasting institutional legacy. This is common for studies of this kind. At the time, stakeholders in the LTMS process agitated for an institutional continuum, but this was resisted.

Outcomes

Overall the scenario development process took two years. Once the technical work had been concluded, the results were presented at four high-level meetings with government, civil society leaders, chief executive officers in the private sector and labor leaders. Some additional inputs were taken and the final results returned to the Cabinet.

The government followed the LTMS study by adopting a policy statement to the effect that it would commit to a peak, plateau and decline in emissions, with international support, setting this trajectory “within” the LTMS results (Raubenheimer, 2011).

The LTMS helped to inform South Africa’s pledge under the Copenhagen Accord, but it also has had some impact on the numerous climate-related policy instruments that followed it. In addition, it has resulted in a change in discourse, including high-level responses from the private sector. The translation of a rigorous fact base into a series of policy options was a critical step that allowed it to capture the

attention and interest of policymakers and leaders from the business and non-governmental organization (NGO) community.

The LTMS was a turning point in South Africa’s climate policy, articulating the vision, policy framework, and strategic directions towards a low-carbon pathway. It enabled South Africa to turn climate change mitigation into a pro-growth, pro-job and pro-development strategy in a carbon-constrained future and built enough confidence for the South African government to set an ambitious strategic direction in mitigating climate change (Winkler, 2010).

There has also been criticism and pushback to some of the results. It is interesting that the government’s response to the study (the peak, plateau and decline policy statement) remains a firm objective. Examples of change in policy include: introducing a carbon constraint into the National Energy Plan; initiating a large-scale renewables power purchase program; and announcing a decision to go ahead with a carbon tax. The LTMS findings have given important impetus into the National Climate Change Response Strategy and the limitations presented by the study have gone a long way in informing the current Greenhouse Gas Mitigation Potential Analysis currently under way. However, coal-driven development remains the cornerstone of South Africa’s planning, and it is worth contrasting the National Planning Commission’s 2030 Plan with the policy statement that followed the LTMS, with its strong call for ‘business unusual’.

Lessons

Successful features

- High-level mandate and engagement. The South African Cabinet issued a mandate to

launch the LTMS process in 2006 and a Cabinet meeting in 2008 established the desired outcomes.

- Tightly coupled researcher–stakeholder interface. LTMS was structured to be a conversation between researchers and stakeholders. A team of 30 researchers worked in close cooperation with an extensive consultation process with more than 80 stakeholders.
- Use of scenarios. A portfolio of evidence-based scenarios was developed based on data provided by technical teams and presented several options ranging from more traditional to transformative development paths. These scenarios were broadly reviewed and refined over time and provided underpinning for informed debate about South Africa’s future development.
- Consensus-driven and mediated approach. An expert facilitator led the process and ensured that all decisions reflected input from government and external stakeholders and that the process established buy-in among all key groups.
- Ramp-up from technical analysis to high-level policy dialogue. The process was grounded in data and rigorous technical assessment and translated this fact base into a series of policy options that captured the attention and interest of policymakers and leaders from the business and NGO community.

Limitations

- The analysis focused more on identifying least cost mitigation options than on developing economically and politically viable climate compatible development options, leaving a gap between its findings and the development of implementable policies.

- There was limited consideration of development impacts (partly due to lack of good data sets and tools at the time).
- There was less stakeholder engagement in elements beyond the scenario building effort, which led to some criticism of the process.

Further Information

Long Term Mitigation Scenarios:

https://open.uct.ac.za/bitstream/handle/11427/16804/Scenario_Building_Team_Long_Term_Mitigation_2007.pdf?sequence=1

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