6. MITIGATION

6.1 Overall approach to mitigation

South Africa's approach to mitigation is informed by two contexts: first, its contribution as a responsible global citizen to the international effort to curb global emissions; and second, its successful management of the development and poverty eradication challenges it faces. The National Climate Change Response is intended to promote adaptation and mitigation measures that will make development more sustainable, both in socio-economic and environmental terms.

South Africa recognises that stabilisation of GHG concentrations in the atmosphere at a level that prevents dangerous anthropogenic interference with the climate system will require effective international co-operation. We therefore regard mitigation as a national priority and are committed to actively engaging in international negotiations under the UNFCCC and its Kyoto Protocol, which South Africa has ratified.

As a responsible global citizen and as a global citizen with moral as well as legal obligations under the UNFCCC and its Kyoto Protocol, South Africa is committed to contributing its fair share to global GHG mitigation efforts in order to keep the temperature increase well below 2°C. In this regard, on 6 December 2009, the President announced that South Africa will implement mitigation actions that will collectively result in a 34% and a 42% deviation below its „Business As Usual' emissions growth trajectory by 2020 and 2025 respectively. In accordance with Article 4.7 of the UNFCCC, the extent to which this outcome can be achieved depends on the extent to which developed countries meet their commitment to provide financial, capacity-building, technology development and technology transfer support to developing countries. With financial, technology and capacity-building support, this level of effort will enable South Africa's GHG emissions to peak between 2020 and 2025, plateau for approximately a decade and decline in absolute terms thereafter.

To this end, the key elements in the overall approach to mitigation include:

6.1.1 ***Setting the performance benchmark*** – Using the National GHG Emissions Trajectory Range, against which the collective outcome of all mitigation actions will be measured. Section 6.4 contains more information about the emissions trajectory.

6.1.2 ***Identifying desired sectoral mitigation contributions*** – Defining desired emission reduction outcomes for each sector and sub-sector of the economy within two years of the publication of this policy-based on an in-depth assessment of the mitigation potential, best available mitigation options, science, evidence and a full assessment of the costs and benefits. Where appropriate, these desired emission reduction outcomes will be cascaded to individual company or entity level;

6.1.3 ***Defining Carbon Budgets for significant GHG emitting sectors and/or sub-sectors*** – Adopting a carbon budget approach to provide for flexibility and least-cost mechanisms for companies in relevant sectors and/or sub-sectors. The initial Carbon Budgets for significant GHG emitting sectors and/or sub-sectors will be drawn up and adopted within two years of the publication of this policy and revised as required based on monitoring and evaluation results, technological advances or new science, evidence and information. A mechanism and process to translate the Carbon Budgets for each relevant sector and/or sub-sector into company level desired emission reduction outcomes will be developed and implemented within three years of the publication of this policy for companies above a minimum emissions threshold. Section 6.5 contains more information about the carbon budget approach.

6.1.4 ***Mitigation Plans*** – Requiring companies and economic sectors or sub-sectors for whom desired emission reduction outcomes have been established to prepare and submit mitigation plans that set out how they intend to achieve the desired emission reduction outcomes.

6.1.5 ***The use of different types of mitigation approaches, policies, measures and actions*** – Developing and implementing a wide range and mix of different types of mitigation approaches, policies, measures and actions that optimise the mitigation outcomes as well as job creation and other sustainable developmental benefits. This optimal mix of mitigation actions will be developed to achieve the defined desired emission reduction outcomes for each sector and sub-sector of the economy by ensuring that actions are specifically tailored to the best available solutions and other relevant conditions related to the specific sector, sub-sector or organisation concerned;

6.1.6 ***Using the market*** – Deploying a range of economic instruments to support the system of desired emissions reduction outcomes, including the appropriate pricing of carbon and economic incentives, as well as the possible use of emissions offset or emission reduction trading mechanisms for those relevant sectors, sub-sectors, companies or entities where a carbon budget approach has been selected.

6.1.7 ***Monitoring and evaluation*** – Establishing a national system of data collection to provide detailed, complete, accurate and up-to-date emissions data in the form of a Greenhouse Gas Inventory and a Monitoring and Evaluation System to support the analysis of the impact of mitigation measures. Section 6.7 contains more information about emissions data collection and section 12 expands on the proposed Climate Change Response Monitoring and Evaluation System.

6.2 South Africa's emissions

South Africa has relatively high emissions for a developing country, measured either per capita or by GHG intensity (emissions per unit of GDP). By any measure, South Africa is a significant emitter of GHGs.

The energy intensity of the South African economy, largely due to the significance of mining and minerals processing in the economy and our coal-intensive energy system, has resulted in an emissions profile that differs substantially from that of other developing countries at a similar stage of development as measured by the Human Development Index. Since coal is the most emissions-intensive energy carrier, South Africas economy is very emissions-intensive. Furthermore, emissions from land-use change (primarily deforestation) contribute a significantly smaller share to our emission profile than for many other developing countries. In 2000, average energy use emissions for developing countries constituted 49% of total emissions, whereas South Africas energy use emissions constituted just under 80% of total emissions. Even in some fast-developing countries with a similar reliance on coal for energy, energy use emissions are lower than South Africa.

In terms of South Africas latest Greenhouse Gas Inventory (base year 2000), the majority of South Africas energy emissions arose from electricity generation, which constituted around half of South Africa's energy emissions and just under 40% of total emissions in 2000. Transportation and energy used in industry contributed just under 10% each of total emissions and industrial process emissions constituted around 14% of total emissions. Emissions from agriculture and land-use change in South Africa constitute only around 5% of emissions, compared to an average of 44% in developing countries as a whole.

6.3 Mitigation potential

Currently available analyses indicate that, unchecked by climate mitigation action, South Africa's emissions could grow rapidly by as much as fourfold by 2050. The majority of South Africa's emissions arise from energy supply (electricity and liquid fuels) and use (mining, industry and transport), and mitigation actions with the largest emission reduction potential focus on these areas. The cost of mitigation actions varies significantly, and published analyses of these costs is likely to require further refinement, especially at sectoral, sub-sectoral and individual organisation levels.

Unlike in other developing countries, South Africa has limited opportunities to cut emissions by tackling deforestation, a sector in which near-term emission reductions are more easily achieved through regulatory policies and enforcement type measures and are therefore relatively inexpensive. While opportunities for mitigation of emissions from non-energy sources do exist, large mitigation contributions will have to come from reduced emissions from energy generation and use. The main opportunities for mitigation consist of energy efficiency, demand management and moving to a less emissions-intensive energy mix, with consequent economic benefits of improved efficiency and competitiveness as well as incentivising economic growth in sectors with lower energy intensities.

Policy decisions on new infrastructure investments must consider climate change impacts to avoid the lock-in of emissions-intensive technologies into the future. However, in the short-term, due to the stock and stage in the economic lifecycle of existing infrastructure and plant, the most promising mitigation options are primarily energy efficiency and demand side management, coupled with increasing investment in a renewable energy programme in the electricity sector. In addition, in the short term, the emergence of bio-fuels and a suite of non-energy mitigation options, such as afforestation, are also important.

A mix of economic instruments, including market-based instruments such as carbon taxes and emissions trading schemes, and incentives, complemented by appropriate regulatory policy measures are essential to driving and facilitating mitigation efforts and creating incentives for mitigation actions across a wide range of key economic sectors. Section 10.7 provides further details on the application of market-based policy instruments.

In the medium-term, the mitigation options with the biggest mitigation potential are:

- shifting to lower-carbon electricity generation options;
- significant upscaling of energy efficiency applications, especially industrial energy efficiency and energy efficiency in public, commercial and residential buildings and in transport; and
- promoting transport-related interventions including transport modal shifts (road to rail, private to public transport) and switches to alternative vehicles (e.g. electric and hybrid vehicles) and lower-carbon fuels.
- In the short and medium term, several other options are available with a smaller mitigation potential, including:
- carbon capture and storage in the synthetic fuels industry;
- options for mitigating non-energy emissions in agriculture and land-use; and
- transitioning the society and economy to more sustainable consumption and production patterns.

In our long-term planning, information (nationally and internationally) about the outcome of mitigation options, technology development, and other new information, may suggest additional mitigation actions.

This policy identifies or sets up processes to identify the optimal combination of actions sufficient to meet the National Climate Change Response Objective. Factors to be considered include not only the mitigation potential, the incremental and direct cost of measures, but also the broader impact on socio-economic development indicators (such as employment and income distribution), our international competitiveness, the cost to poor households and any negative consequences for key economic sectors.

6.4 The Benchmark National GHG Emissions Trajectory Range

In 2008, in the context of South Africa's moral and legal obligation to make a fair contribution to the global mitigation effort under the UNFCCC and its Kyoto Protocol, Cabinet fully considered the Long Term Mitigation Scenario study of the country's mitigation potential. This led to the announcement that South Africa's emissions should peak in the period from 2020 to 2025, remain stable for around a decade, and decline thereafter in absolute terms. The President confirmed this strategic policy direction at the 2009 National Climate Summit and further detailed this as a South African undertaking in the context of all legal obligations under the UNFCCC and its Kyoto Protocol prior to the international UNFCCC Climate Change Conference in 2009 (see 6.1 above). This strategic policy direction and international undertaking has informed a National GHG Emissions Trajectory Range, projected to 2050, to be used as the benchmark against which the efficacy of mitigation action will be measured.

The benchmark National GHG Emissions Trajectory Range:

6.4.1 Reflects South Africa's fair contribution to the global effort to limit anthropogenic climate change to well below a maximum of 2oC above pre-industrial levels.

6.4.2 Details the "peak, plateau and decline trajectory" used as the initial benchmark against which the efficacy of mitigation actions will be measured (see the document published by the Department of Environmental Affairs (DEA) in 2011 entitled "Defining South Africa's Peak, Plateau and Decline Greenhouse Gas Emission Trajectory"). In summary:

- South Africa's GHG emissions peak in the period 2020 to 2025 in a range with a lower limit of 398 Megatonnes (109 kg) (Mt) CO_2-eq and upper limits of 583 Mt CO_2-eq and 614 Mt CO_2-eq for 2020 and 2025 respectively.
- South Africa's GHG emissions will plateau for up to ten years after the peak within the range with a lower limit of 398 Mt CO_2-eq and upper limit of 614 Mt CO_2-eq.
- From 2036 onwards, emissions will decline in absolute terms to a range with lower limit of 212 Mt CO_2-eq and upper limit of 428 Mt CO_2-eq by 2050.

6.4.3 Defines an initial National GHG Emissions Trajectory Range, which may be reviewed in the light of monitoring and evaluation results, technological advances or new science, evidence and information.

6.5 The Carbon Budget Approach

Recognising that due to the current emissions-intense structure of the economy, many sectors require a flexible mitigation approach, which enables the development and use of lowest-cost options such as offset and other types of market-based mechanisms. For such sectors, a Carbon Budget (CB) approach is adopted that specifies desired emission reduction outcomes consistent with the benchmark national GHG emissions range trajectory. To this end, CBs will be drawn up within two years of the publication of this policy for relevant economic sectors and subsectors, particularly in the major energy supply (electricity and liquid fuels) and use (mining, industry and transport) sectors. These CBs will be updated as required based on monitoring and evaluation results, technological advances or new science, evidence and information. The CBs will be released in conjunction with the National Climate Change Response Monitoring and Evaluation System, which includes an enhanced National Greenhouse Gas Inventory process.

The CB process will identify an optimal combination of mitigation actions at the least cost to-and with the most sustainable development benefits for-the relevant sector and national economy to enable and support the achievement of the desired emission reduction outcomes consistent with the benchmark National GHG Emissions Trajectory Range. Government will actively consult with industry and other key stakeholders in the development of CBs and approaches, mechanisms and outcomes.

The process to draw up or to review the CBs will consist of the following steps:

6.5.1 Review of the contributions making up the national emissions trajectory informed by historical emissions and trends and the most recent and best available scientific evidence and information.

6.5.2 Identification of a portfolio of enabling mitigation programmes and measures, including economy-wide measures and instruments, such as a carbon tax and incentives to industry and households, and the financial resources available to support them.

6.5.3 Analysis of :

- current and future emissions trends by sector and sub-sector,
- the timing, scale, cost and risk of different mitigation actions for each economic sector and sub-sector, and
- the economy-wide implications of mitigation actions, in particular on jobs.

6.5.4 Development of desired emission reduction outcomes for each sector and sub-sector of the economy. These will include short-, medium- and long-term CBs for sectors and sub-sectors where a CB approach is relevant. In respect of significant point-source emissions, the CBs will be cascaded down to sub-sectors and, ultimately, companies whose emissions are above a specified threshold.

6.5.5 Consultation with:

- The National Treasury, the Departments of Trade and Industry and Economic Development on the implementation of fiscal measures, incentives and other support measures, such as the carbon tax, including an assessment of the measures' effectiveness and benefits, and any other key parameters.
- Any other relevant entity about other means of implementation that may be required.
- Stakeholders, in particular organised business and labour.

6.5.6 The IGCCC will establish a process to provide analytical resources to support the development of the CB approach.

6.6 Sectoral mitigation and lower-carbon development strategies

Under the leadership of the relevant national sector government department, each significantly emitting economic sector or sub-sector will be required to formulate mitigation and lower-carbon development strategies. These strategies will specify a suite of mitigation programmes and measures appropriate to that sector or sub-sector. They will also provide measurable and verifiable indicators for each programme and measure to monitor their implementation and outcome. These strategies

will outline how to implement the proposed mitigation programmes via existing implementation mechanisms, such as the IRP 2010, or via modified or new mechanisms (see 10.1.2). For example, in respect of industrial emissions, approved mitigation plans will conform to the Air Quality Management Act's requirements for Pollution Prevention Plans prepared by identified industries and sectors.

6.7 GHG emissions inventory

Accurate, complete and up-to-date data is the foundation of an effective response. Two essential elements for the definition of desired emission reduction outcomes and the development of CBs are emissions data and data to monitor the outcome of specific mitigation actions. This section details the GHG Emissions Inventory and section 12 details the climate change monitoring and modelling requirements, as well as the evaluation of mitigation actions.

The DEA in partnership with the South African Weather Service, the host of the SAAQIS, will prepare a GHG Emissions Inventory annually. The inventory will conform to the IPCC's 2006 or later guidelines, and will be periodically reviewed by an international team of experts. The inventory will also undertake and report analyses of emissions trends, including detailed reporting on changes in emissions intensity in the economy and a comparison of actual GHG emissions against the benchmark national GHG emission trajectory range described in section 6.4.

As is currently contemplated by the DEA, reporting of emissions data will be made mandatory for entities (companies and installations) that emit more than 0.1 Mt of GHGs annually, or that consume electricity which results in more than 0.1 Mt of emissions from the electricity sector. Qualifying entities will also be obliged to report energy use by energy carrier and other data as may be prescribed. The emissions inventory will be a web-based GHG Emission Reporting System and will form part of the National Atmospheric Emission Inventory component of the SAAQIS. It will be developed, tested and commissioned within two years of the publication of this policy.