6 Envisaging a Way Forward for South Africa

> "Our vision for South Africa in 2018 includes: a diversified, supply secured sustainable energy sector; achieving a 25-percent share of the global hydrogen and fuel cell catalysts market with novel platinum group metal (PGM) catalysts; and being a world leader in climate science and the response to climate change."
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> - Department of Science and Technology. (2008) *Ten Year Plan for Science and Technology*

Climate change is resulting in changes in national, regional and international regulatory landscapes, influencing supply chains, shifting consumer preferences and providing a variety of new commercial opportunities. Navigating these complexities and ensuring a resilient and strengthened economy requires collaborative work on the part of business, government, labour, non-governmental organisations (NGOs) and the research community.

This section of the report attempts to highlight a number of key elements that could form part of a wider national mitigation response to climate change, with the intention of avoiding potential pitfalls and realising tangible economic benefit. The themes touched on are by no means exhaustive, but consider pertinent components of a proposed way forward.

6.1 Addressing Key Economic Risks

Left unaddressed, risks to the South African economy from climate change can be expected to intensify, with an increasing level of international action by governments and non-governmental actors influencing and affecting South African industries. Key risks drawn out from this study that need to be addressed are outlined in the table below:

Table 7: Addressing Key Economic Risks

Sector	Risk Type	Potential Response Measures
Agriculture, Forestry & Fisheries / Manufacturing (Food & Beverages)	- Supply chain: food miles	▪ Highlight the requirement for a sustainable development approach to food miles that recognises the important socio-economic benefits of agriculture for Africa, even as these countries attempt to cope with detrimental physical impacts from climate change. Awareness raising and support from retailers, industry associations and consumers in key export markets is required ▪ Conduct product life cycle assessments of key items in comparison with international competitors to provide true comparison of emissions ▪ Support cross sector partnerships between food and beverage producers, packaging manufacturers and logistics to reduce emissions across the value chain ▪ Highlight the food and other air miles associated with goods imported into South Africa i.e. the export

Sector	Risk Type	Potential Response Measures
		carbon miles associated with goods from Europe
Mining & Quarrying	- Carbon pricing - Sector emission caps	▪ Ensure parity on climate change matters, particularly pricing mechanisms, with key competitor countries such as Canada, the USA, Russia and Australia at a minimum, as part of ongoing climate negotiations ▪ Support substantial energy efficiency programmes in mining and diversify national energy mix to reduce climate change liabilities
Manufacturing (Petroleum Products)	- Carbon pricing - Sector emission caps - Investor risk	▪ Carbon pricing risk for coal-to-liquids and gas-to-liquids programmes to be addressed through possible exploration into other technologies including hydrogen power, renewable energy, combined cycle gas turbines (CCGT) and integrated gasification combined cycle (IGCC) linked to CCS ▪ Incorporation of carbon pricing at micro level within project feasibility assessment and investment decision making ▪ Emphasis on synfuels production for pilot CCS programmes
Manufacturing (Chemicals)	- Carbon pricing - Sector emission caps	▪ Reduction in carbon pricing risk through promotion of energy efficiency and through ensuring sector based equivalence with competitor nations, as part of ongoing climate negotiations ▪ Diversification of national electricity mix to reduce carbon liabilities
Manufacturing (Non-Metals: Glass and Cement)	- Carbon pricing - Sector emission caps - Supply chain	▪ Management of potential sector based emission caps or intensity targets for cement through ensuring parity with competitor nations ▪ Monitor any attempts to introduce a Border Tax Adjustment, particularly in the EU ▪ Reduction in carbon pricing risk through promotion of efficiency measures and reduced clinker content in cement ▪ Improved energy efficiency, cullet recycling and bottle light weighting in glass manufacture ▪ Diversification of national electricity mix to reduce carbon liabilities
Manufacturing (Metals: Iron and Steel, Aluminium)	- Carbon pricing - Sector emission caps	▪ Reduction in carbon pricing risk through the promotion of efficiency measures ▪ Management of potential sector based emission caps or intensity targets for iron and steel production through effective engagement with competitor nations

Sector	Risk Type	Potential Response Measures
		▪ Monitor any attempts to introduce a Border Tax Adjustment, particularly in the EU ▪ Implement the use of recycled aluminium where possible, and promote the use of aluminium as an important material in vehicle efficiency design ▪ Promote valued added industries such as in the production of aluminium based products
Utilities (Electricity)	- Carbon pricing - Investor risk - Sector emission caps	▪ Strong risk of sector based emission reduction targets and heightened operational costs through carbon taxation to be addressed through investment diversification, securing international financial support for clean energy technologies, power generation efficiency measures and reduced peak electricity demand through demand side management ▪ Significant investment cost savings can be achieved through technologies such as solar water heaters and efficient appliances in driving down peak electricity demands, thereby reducing overall system requirements and power station capacity needs
Construction	- Regulatory risk through enhanced efficiency standards - Carbon pricing	▪ Monitor regulatory developments and investigate best practices in managing sustainable or green building code compliance ▪ Support enhanced efficiency measures, particularly in new building stock, in order to reduce energy consumption requirements ▪ Address the thermal efficiency requirement in residential housing to mitigate heightened peak demand requirement derived from increased household connections and residential energy use
Trade, Catering and Accommodation Services (Tourism and Hospitality)	- Trade and market access - Promotion of local tourism in European and North American markets - Increased fuel costs impacting long haul flights and business travel - EU Directive on Aviation	▪ Highlight the requirement for a sustainable development approach to tourism that recognises the industry's important socio-economic benefits for Africa, drawing on the principles of the Davos Declaration and World Tourism Organization (UNWTO) Resolution on Tourism and Climate Change ▪ Promote public transport and non-motorised transport, as well as dedicated rail network links between major airports and cities, as part of the delivery of low carbon tourism efforts ▪ Support cross sector partnerships between aviation, industry associations and tourism marketing, as well as hotel and accommodation services, to support and promote emission reduction activities

Sector	Risk Type	Potential Response Measures
		▪ Conduct a life cycle analysis of key tourism destinations and itineraries, identifying areas of strong GHG reduction potential ▪ Offer high sustainability local carbon offsets to tourists as part of existing and future travel packages ▪ Address other tourism related concerns such as safety and security and improved human resource capacity to promote wider competitiveness
Transport, Storage and Communication **(Road Based Freight, Aviation & Shipping)**	- Carbon pricing - Sector based emission caps in maritime sector - EU Directive on Aviation	▪ Introduce measures to enhance vehicle, aeroplane and shipping fuel efficiency, including fuel economy standards for light vehicles ▪ Support a global agreement on shipping emissions as and when this comes into place, rather than a variety of regional agreements with different compliance criteria ▪ Provide enhanced logistics planning, intelligent traffic management and effective public transport in support of wider freight based efficiency
Financial, Insurance, Real Estate and Business Services	- Carbon pricing - Investor risk	▪ Significant potential risk for investors is associated with carbon intensive infrastructure in the context of a national carbon pricing regime or sector based targets for large emitters ▪ Integrate climate change considerations into risk management systems, including project financial and risk evaluation methods

As the table above demonstrates, in a number of instances it is possible to turn climate related risks into potential opportunities and market differentiators. Such an approach will require proactive measures to identify and develop effective solutions, and may require cross-sectoral collaboration to achieve significant results.

6.2 Exploiting Key Economic Opportunities

It is important that South Africa look to exploit key economic opportunities brought about by climate change. The value of these initiatives will be increasingly realised as both national and international pressure to address emissions increases, and as the climate externality is increasingly incorporated within market forces. Key areas of economic opportunity drawn out from this study are outlined in the table below:

Table 8: Exploiting Key Economic Opportunities

Sector	Opportunity Type	Potential Response Measures
Agriculture, Forestry & Fisheries	- Fire control - Organic farming - Biofuels - Biomass power generation - Land based carbon offsets - Manure management	▪ Promotion of labour intensive agricultural practices in support of fire control, organic farming, biofuels and land based carbon offsets, including through the EPWP ▪ Support for biomass based power generation, including from agricultural residues, via the Renewable Energy Feed-In Tariff process ▪ Investigate the development of a Regional Biofuels Strategy for the Southern African Development Community (SADC) region to support biofuel investment opportunities in Sub-Saharan Africa ▪ Development of biogas digesters and organic manure fertilisers in poultry, cattle and pig farming where viable
Mining & Quarrying	- Platinum - Copper - Uranium	▪ Promote the use of platinum as a catalyst in fuel cells and consider establishing hydrogen power technologies for domestic and export markets ▪ Promote the use of domestic uranium and copper supplies where appropriate in energy efficiency applications and power generation
Manufacturing (Electrical Machinery & Apparatus)	- Energy efficiency	▪ Identify industry energy efficiency requirements and establish local manufacture of equipment where desirable ▪ Support import tariff liberalisation of energy efficient products for which local manufacture is deemed undesirable or unfeasible ▪ Promote local manufacture of clean energy technologies for national and regional application, including as part of government procurement efforts
Manufacturing (Transport Equipment)	- Rail and public transport equipment - Electric vehicles	▪ Enhance domestic manufacturing capacity in rail and bus technologies ▪ Support current investment and export opportunities for electric vehicle entrepreneurs, such as the current Joule electric car developed in

Sector	Opportunity Type	Potential Response Measures
		South Africa
Utilities **(Electricity, Gas and Water)**	- Grid connected renewable energy - Energy efficiency - Attraction of new clean energy finance & investment	▪ Access international financial support for the subsidy period required under the REFIT before cost equivalence is achieved with conventional technologies ▪ Reassess caps on renewable energy resources within electricity planning based on potential international financing support measures ▪ Support labour intensive renewable energy generation in the traditional electricity sector which is currently characterised by declining employment levels ▪ Promote private sector electricity market participation including through securing Power Purchase Agreements in accordance with electricity regulations ▪ Develop a long-term Renewable Energy Strategy and target, with consideration to areas of potential comparative advantage, desired support areas and long-term grid planning ▪ Support for local renewable energy manufacture and maintenance, including for concentrating solar power, wind and solar photovoltaic (PV) systems such as thin-film solar PV ▪ Identify new areas of clean energy investment ▪ Provide an enabling environment for investment on the part of multilateral lenders, venture capital, private equity and others, via ensuring the ability to sell electricity to the national and municipal grids at a market determined price ▪ Ensure an Independent System Operator and Single Buyer Office ▪ Consider the introduction of an energy efficiency trading scheme, linked to the global carbon market, to support cost effective efficiency measures in industry, including through the proposed Power Conservation Programme (PCP) ▪ Provide adequate finance and authority to an independent body tasked with implementing energy efficiency across all levels of society ▪ Emphasise the reduction of residential peak demand in managing overall power system investment requirements ▪ Through the Working for Energy programme provide support for various energy efficiency and renewable energy technologies

Sector	Opportunity Type	Potential Response Measures
Construction	- Solar water heaters - Insulated ceilings	▪ Promote local solar water heater and insulated ceiling manufacture through Small, Medium and Micro Enterprise (SMME) support programmes, tax rebates and business support information ▪ Co-ordinate energy efficiency measures through an independent and sufficiently resourced energy efficiency agency linked to business support centres, industry associations and tax rebates
Financial, Insurance, Real Estate and Business Services	- Climate change related service provision - Carbon markets and trading - Energy efficiency support measures & services - Teleconferencing and green IT - Clean energy finance & investment project capital	▪ Establish a Business Climate Change Support unit within existing industry channels, through which climate expertise, resources and tools can be shared ▪ Establish appropriate sector based emission reduction strategies and plans to mitigate against national, regional and international climate related risks ▪ Identify areas of potential commercial opportunity in teleconferencing facilities, green IT and clean energy investment ▪ Provide SMME support and training to start up energy management companies ▪ Maintain a national clean energy Research and Development (R&D) hub to target specific technologies for long-term research, support and deployment ▪ Integrate low carbon planning within urban design including through support for non-motorised transport, densification, mixed land use and public transport ▪ Develop South Africa's climate change research, policy and response expertise ▪ Provide support for mitigation and adaptation policy, response measures and implementation within the SADC region ▪ Integrate domestic clean technology opportunities within the Industrial Policy Action Plan (IPAP)

An analysis of key mitigation measures in the energy sector provides an instructive example of opportunities to support job creation, energy security and economic growth in the country. Recent modelling of key interventions in this sector with a strong sustainable development benefit, ranging from improved vehicle efficiency, enhanced public transport and commercial energy efficiency, through to the increased use of natural gas and renewable energy, confirms the wider economic potential of low carbon energy solutions in South Africa. Under a Sustainable Development Policies and Measures (SD-PAMs) approach to addressing emissions in the energy sector, cumulative GHG savings of 2 863Mt CO_2e are achieved

between 2001 and 2030, derived at a net cost saving over the period of R4 754 per ton of CO_2e abated (ERC, 2008). This is a significant economic saving per ton of carbon abated.

Such commercial opportunities need also to be placed in the context of declining employment levels in the traditional electricity sector as a result of increasing capital intensity. Between 1985 and 2005, the South African electricity generation sector shed approximately 40 000 jobs, despite a considerable increase in power capacity during this period (Quantec Standardised Industry Database, 2009). The current potential for employment creation in renewable energy in comparison to conventional technologies is marked, as UNEP report:

> "About 2.3 million people have in recent years found new jobs in the renewable energy sector, even though these provide only 2 per cent of global primary energy. In comparison, total employment of the oil and gas, and oil refining industries in 1999 was just over 2 million jobs" (UNEP, 2009 p19).

Emphasis on promoting a local renewable energy industry has prompted calls for South Africa to set a target of 15% renewable energy supply by 2020, based on the potential for job creation and economic advancement. This includes increasing calls for the development of renewables from the private sector (see NBI, 2009).

6.3 Business Involvement on Climate Change

Business in South Africa has begun to respond to this global challenge, and in various areas, has led the way in delivering commercial solutions to climate change. The recent formation of climate working groups, facilitated by the National Business Initiative (NBI), provides further positive signs in this regard.

Private sector dialogue on climate issues, including how best to address key concerns and incorporate the role of business, is essential to ensure that efficient and effective mechanisms are put in place as both domestic and international climate rules are laid out. Failure to identify and address emerging threats and enablers could prejudice a number of South African businesses.

The private sector has a key role to play in the finalisation of the National Climate Change Response Policy by the end of 2010. However, in addition to supporting existing policy development procedures, it is suggested that effective business action on climate change requires a number of complementary measures, including:

- **The establishment of a national Business Support Unit on climate change,** through which climate expertise can be channelled to business in support of technical and strategic planning. This entity should be effectively embedded within an existing industry association, such as the NBI or Business Unity South Africa (BUSA)

  The provision of a climate support unit linked to existing initiatives, such as the Energy Efficiency Accord, and the ability to highlight commercial opportunities through carbon finance and tax rebates, offers the potential to pool knowledge and resources whilst catalysing climate efforts. Linkages with additional activities, such as the BUSA and Department of Trade and Industry (dti) climate change forum, can also be provided through this entity

- **The movement of climate change onto the company executive level.** Chief Executive Officers and the Executive Boards of companies are crucial in determining a company's positioning in a low carbon future. The role of executives in this regard includes:

  - Developing a strategic understanding of climate change issues and the implications for their industry

- The ability to take a longer-term (five year plus) view when making investment decisions that have a carbon or climate change component
- Providing leadership and drive to secure the change necessary to prepare the business for a low carbon economy

- **Regular and formalised communication channels between business, government, labour and civil society on climate change.** Under the auspices of the National Committee on Climate Change (NCCC), or other suitable body, engagement by key societal role-players is essential for ensuring that national climate decisions are consultative and supported at the international level

Taken together, the above measures can support business preparedness for climate change and assist companies to thrive in carbon constrained environments.

6.4 National Policy Direction

South Africa is currently preparing the policy environment in which climate change is to be addressed in the country. The development of a Climate Change Response Policy is underway, underpinned by the national emission reduction target, and National Treasury has been extensively involved in evaluating the use of carbon pricing in the economy. This policy development process raises important issues for consideration, including:

- **The need for a consistent policy direction.** A clear policy direction is required on climate change that is consistent across key government departments. Of key concern is the integration of climate change objectives within energy and transport planning, Research and Development (R&D), as well as industrial policy. A clear and transparent regulatory environment also supports a stable investment climate, a key requirement if South Africa is to invest heavily in low carbon assets
- **The phasing-in of climate regulations.** The Department of Environmental Affairs (DEA) has for a number of years made clear its intention to introduce the mandatory reporting of emissions in South Africa, followed by the introduction of a suite of regulatory and fiscal measures. The provision of adequate lead times on new regulations for business is an important means for promoting buy-in, reducing transaction costs and supporting commercial solutions. In addition, promoting results based targets, and providing the private sector with flexibility in abatement choices, supports innovation and reduces compliance costs
- **Short-term planning is required to match our long-term vision.** Whilst exploiting quick wins is instrumental to South Africa's mitigation approach, much decision making and planning is required in the short-term to ensure that longer-term emission objectives are achievable. The framework for South Africa's long-term carbon future is likely to be laid in the next decade or so
- **Support for wider industry competitiveness.** Measures must also be considered to ease the financial or other burden on companies. This includes the use of complementary policies to enhance industrial competitiveness in other areas, supporting revenue neutral environmental taxation as far as possible, and ensuring that national measures are complemented by mitigating risks at the global scale, whilst ensuring a fair global climate deal for South Africa. Effective business support on climate change, whereby key issues, related to regulation, financial opportunities and commercial risks, can be identified and addressed, and linked to existing support measures, forms an additional component. Significant business support is required if the national emission reduction target is to be achieved, and indeed, if South Africa is to address the multitude of risks and opportunities brought about by global mitigation response measures

A comprehensive roadmap for climate change in South Africa, backed by integrated planning and flexibility in the development of commercial solutions, offers a number of opportunities for the private sector to address climate related issues.

6.5 Funding and Technology Transfer

South Africa has potential to benefit from international funding allocations and technology transfer in support of low carbon development. The work of the Clinton Climate Foundation and the World Bank's Clean Technology Fund (CTF) provide examples of current financial assistance, and in the case of the CTF, the granting of sizeable soft loans to aid mitigation efforts in South Africa.

Although the details on available international funding are still to be clarified, significant allocations for low carbon solutions committed to by Japan, the United States and EU within the Copenhagen Accord, highlight additional areas of funding to be allocated to developing countries, a portion of which could be directed to mitigation actions in South Africa. A variety of bilateral arrangements between individual nation states and sectoral agreements may also be entered into in support of agreed upon outcomes.

Technology transfer offers opportunities for industry partnerships and joint ventures between developed and developing countries, as well as reduced licensing costs for new technologies and the transfer of skills and experience. Stumbling blocks may be experienced in certain areas, such as in relation to intellectual property rights, but support for technology transfer remains a key tenet of international climate change agreements.

South Africa's announcement of a national emission target conditional on finance, technology transfer and capacity building makes clear the country's intention to engage in comprehensive mitigation actions provided that effective international assistance is realised. A number of technologies that could benefit from financial and technological support, linked to capacity building and support for long-term socio-economic objectives are listed below:

Table 9: Technological and Financial Assistance in Support of Mitigation

Forms of Support	Sector	Mitigation Action
Technology transfer and/or financial flows through: ▪ **Internationally registered NAMAs** ▪ **Bilateral agreements** ▪ **Sectoral agreements**	**Utilities** **(Gas, Electricity)**	▪ Solar power, including Concentrating Solar Power (CSP), Solar PV and Solar Water Heaters ▪ Clean coal technologies, including Integrated Gasification Combined Cycle (IGCC), supercritical and ultra-supercritical power generation and Carbon Capture and Storage ▪ Wind power ▪ Energy efficiency technologies including boiler efficiency improvement, smart meters and monitoring tools ▪ Policy instruments including energy efficiency targets and the Renewable Energy Feed-In Tariff (REFIT) ▪ Combined Cycle Gas Turbines (CCGTs)

Forms of Support	Sector	Mitigation Action
		▪ Waste management including recycling methods and biogas utilisation
	Manufacturing (Petroleum Products)	▪ Hydrogen energy and fuel cell technologies, including within syngas production ▪ Carbon Capture and Storage
	Agriculture, Forestry and Fishing	▪ Conservation agriculture including reduced tillage and precision farming ▪ Fire control ▪ Enteric fermentation
	Mining & Quarrying	▪ Coal Bed Methane (CBM): extraction and use
	Transport, Storage and Communication	▪ Urban mass transport systems ▪ Traffic management systems ▪ Fuel efficiency improvements ▪ Electric vehicles
	Financial, Insurance, Real Estate and Business Services	▪ Carbon pricing ▪ National emission inventories and reporting

Source: Own analysis, DST (2007) and Imbewu (2009)

6.6 Sector Support Mechanisms

A number of key sectors in South Africa, including Agriculture, Mining, Manufacturing, Electricity, Construction, Trade and Financial Services could be substantially impacted by climate change. Increasing governmental and non-governmental action on climate change, including the progression of domestic climate policy, calls for increasing sector based responses.

Such an approach is particularly pertinent given the increasing emphasis on sector based action in developed countries. It is critical that South Africa develop a thorough understanding of proposed sector based mechanisms or 'new mechanisms', to ensure that the implementation of any such programmes provides a fair and robust approach to emission reductions, and provides opportunities for the country to share in sector-based carbon markets. Whilst sectoral approaches did not receive much attention at the Copenhagen Conference of the Parties (COP), it is expected that this issue will come into greater focus in future years, necessitating that South Africa is fully aware of the potential risks and benefits that are on offer.

Regardless of current international approaches, the announcement of the national emission reduction target, commensurate on an effective global climate deal being established, outlines the significant mitigation task for many sectors in South Africa. Establishing sectoral emission reduction strategies and action plans, linked to both national policy and global debates on the

use of sector based mechanisms, is of paramount importance in the effective management of climate concerns.

Sector-based mitigation plans, focused on both high risk and high opportunity sectors and co-ordinated through relevant government departments, forums and industry associations, is consider the third critical element in a comprehensive national mitigation response, linked to both effective business engagement on climate change, and the establishment of a clear and consistent policy framework in South Africa.

Finally, it is also the case that a variety of cross sectoral partnerships will be required. For example, reducing emissions in the tourism industry will require partnership between aviation groups, hospitality services, transportation providers, tour operators and tourism marketing centres. The identification of requisite partnerships should from part of comprehensive sector climate change strategies and plans.