Norad Report 19/2008 Discussion

Norad

"Climate Proofing and Greening of the Portfolio"

Issues Paper and Possible Next Steps

The Royal Norwegian Embassy,
Pretoria, South Africa

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FINAL REPORT

The Royal Norwegian Embassy,
Pretoria, South Africa

"Climate Proofing and Greening of the Portfolio". Issues Paper and Possible Next Steps

7. April 2008

Norad

PREAMBLE

The Royal Norwegian Embassy in Pretoria (the Embassy) has requested Norad to undertake a desk review of how climate change and environment can be further integrated into the Embassy's development cooperation portfolio. The overall ambition is to respond to the request of the Norwegian Ministry of Foreign Affairs (MFA) to increase efforts on addressing climate change. All Embassies have been asked to increase efforts to ensure mainstreaming of environment, climate change and gender and measures to combat corruption.

The desk review has been based on available material, partly provided by the Embassy. Due to time limitations it has not been possible for the Review Team to solicit input from South African and Norwegian partners. Therefore, the ideas and suggestions provided by the Team to strengthen the climate change dimensions in the Embassy's portfolio have not been vetted by cooperation partners.

The Review Team comprised of Hans Olav Ibrekk, Rolv Bjelland and Helle Biseth. In addition the Team has received inputs from various Norad colleagues and has had brief discussions with representatives of Norwegian institutions involved in cooperation with South Africa.

The Review Team appreciates the cooperation with the Embassy and look forward to continued cooperation.

7. April 2008

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1.1 Introduction

The Norwegian Action Plan for Environment in Development Cooperation was presented in June 2006. The Government's aim is for Norway to play a leading role in making environmental concerns an integral part of all development cooperation. The ultimate goal of Norway's efforts is for developing countries to acquire the capacity and competence necessary to safeguard their right to a clean environment and the ability to manage their natural resources in a sustainable manner. The action plan sets the direction for Norway's efforts for the next ten years.

All Norwegian Embassies are requested to increase their efforts on addressing climate change. Reporting on national developments will be an important task, as well as assessing continuously how Norway can assist in achieving set climate change targets and objectives. The role each partner country can play in climate change negotiations and providing support to activities that can move partner countries towards accepting long-term commitments will be of key importance.

The Ministry of Foreign Affairs (MFA) has instructed all Embassies to increase efforts to ensure mainstreaming of environment, climate change and gender and measures to combat corruption. Increased reporting on these issues is expected.

Furthermore, impacts of climate change and 'climate proofing' should constitute an element of the overall policy dialogue with RSA, including in the dialogue with multilateral institutions and non-governmental organizations (NGOs). According to the draft Annual Letter to the Embassy climate proofing of the development cooperation portfolio entails that all energy-related programs should not increase emissions of greenhouse gases (GHGs) and that adaptation should be considered as part of all development cooperation activities.

The Desk Review is aimed at assisting the Embassy in fulfilling this obligation.

1.2 Climate Proofing and Environmental Mainstreaming in the Context of the Embassy's Portfolio

The Norwegian development cooperation with the Republic of South Africa (RSA) focuses on six key areas: Energy, Environment, Higher Education and Research Cooperation, Fisheries, Human rights and support through NGOs. In addition the Embassy is responsible for bilateral support to Namibia and Botswana and a number of regional initiatives. This report only deals with South Africa.

Screening for climate risks represents a first step towards "**climate-proofing**" of development programs. The portfolio of activities to be implemented under a development program should be screened in order to identify not only activities at risk of climate change but also those that are not climate sensitive and do not, therefore, require further risk analysis. The point of departure for this is the following question:

- What is the country's (including the specific area where the development program will be implemented) vulnerability and risks from climate change and extreme weather (e.g. coastal areas, river deltas, fragile ecosystems, snow capped mountains, and dependency on agriculture, forestry, and fisheries)?

  - This is admittedly a difficult task since climate projections are not certain and detailed enough to allow a straightforward application in development planning. Moreover, climate models have severe limitations when it comes to generating the type of information required.
  - Climate risks are specific with regard to country, location and sector.

Based on the information obtained on expected changes a "climate lens" could be applied to the process of analyzing a development cooperation program with a view to identifying:

- the extent to which climate change risks have been taken into consideration in the preparation of the program;
- the extent to which the program, including policy or strategy, is potentially vulnerable to climate change;
- the extent to which the program could lead to increased vulnerability and, therefore, maladaptation;
- potential impacts on GHG emissions; and
- what amendments might be warranted in order to "climate proof" the program.

Based on the preliminary information obtained through applying the "climate lens" development programs should be classified into three risk categories:

- **Category 1 - High risk** – full climate risk assessment required
  - Development programs with diverse and significant relationship to climate within:
    - Agriculture; Water resources; Energy; Natural resources management (forestry, fisheries, land use management); Health; Coastal development and management and other Infrastructure (e.g. roads).
- **Category 2 – Partial or moderate risk** – selective climate risk assessment required:
  - Includes development programs at moderate risk:
    - Activities which may have some specific climate vulnerabilities, especially in the sectors mentioned under Category 1.
    - Activities which potentially increase vulnerabilities external to the project.
- **Category 3 - Low/no risk** – No assessment required.
  - Includes development programs that are not affected in any significant way by climate, and not affecting external vulnerabilities, e.g. within:
    - Education; Good governance; Human rights

Addressing/integrating environment implies 'mainstreaming' of environment in the Embassy's portfolio. For the Embassy the integration of environment during programming serves two objectives:

1. To identify and avoid harmful direct and indirect environmental impacts of cooperation programs in the different sectors which can undermine sustainability and counteract achieving the development co-operation objectives of the program – "**do no harm**";
2. To recognize and realize opportunities for enhancing environmental conditions, thereby bringing additional benefits to development and economic activities and advancing environmental issues – "**do good**"; and
3. Combined this will contribute to a "**greening**" of the Embassy's portfolio.

1.3 Context – Climate Change and South Africa

South Africa has the 14th biggest carbon dioxide emissions per capita and the 7th most carbon-intensive economy in the world. South Africa has the world's largest coal power stations which supply 93% of its electricity from low-grade coal through a process that wastes two

thirds of the coal's energy during the conversion to electricity (see Annex II – Key environment indicators for South Africa).

For Southern Africa, sub-continental warming is predicted to be greatest in the northern regions. Temperature increases in the range of between 1^0C and 3^0C can be expected by the mid 21st century, with the highest rises in the most arid parts of the country. Of greater consequence for South Africa, as a semi-arid country, is the prediction that a broad reduction of rainfall in the range of 5% to 10% can be expected in the summer rainfall region. This will be accompanied by an increasing incidence of both droughts and floods, with prolonged dry spells being followed by intense storms. A marginal increase in early winter rainfall is predicted for the winter rainfall region of the country. The south and west of South Africa is expected to become warmer and drier, with more irregular rainfall patterns. In the eastern half of the country, climate change is expected to result in more severe and unpredictable rainfall, resulting in severe flooding.

South Africa developed a "National Climate Change Response Strategy" in September 2004 (DEAT, 2004). According to the strategy measurable changes in climate can be expected to have significant effects on various sectors of South African society and the economy. The strategy further highlights the following key impacts:

- **Health** impacts can be expected from increases in temperature and changes in rainfall patterns. These include an increase in the occurrence of strokes, skin rashes, dehydration and the incidence of non-melanoma skin cancers. As a result of ecosystem changes, climate change may also bring about indirect health impacts such as an increase in the incidence of water-borne diseases. The occurrence of vector-borne diseases such as malaria could also increase if there is a significant extension of the malaria prone areas;
- With regard to **water resources**, South Africa's rainfall is already highly variable in spatial distribution and unpredictable, both within and between years. Much of the country is arid or semi-arid and the whole country is subject to droughts and floods. Thus a reduction in the amount or reliability of rainfall, or an increase in evaporation would exacerbate the already serious lack of surface and ground water resources. Water availability in the arid and semi-arid regions, which cover nearly half of South Africa, is particularly sensitive to changes in precipitation. Desertification, which is already a problem in South Africa, could be exacerbated by climate change. Furthermore, climate change may alter the magnitude, timing and distribution of storms that produce flood events.
- Seventy percent of the **land** surface of South Africa consists of natural and semi-natural ecosystems which provide rangelands for large herbivore species. Modeling suggests a general aridification of this type of land, especially where such rangelands are already marginal. Fodder production can be expected to be impacted, affecting marginal costs of ranching. Further, tree encroachment into the grassland areas is likely to increase due to the elevated CO2 concentrations and the increase in temperature. The frequency of fire outbreaks is predicted to increase significantly.
- About 70% of total grain production in South Africa consists of **maize**. Crop yield modeling predicts that, under a hotter drier climate, maize production will decrease by up to 20%, mostly in the drier western regions. An increase in pests and diseases would also have a detrimental effect on the agricultural sector and invasive plants could become a greater problem.
- The South African **forestry** sector is sensitive to climate change as it is based on plantations of non-indigenous species, located in relatively marginal areas, which comprise about 1.5% of the land area of the country. In addition to the effects of climate change, factors such as land availability, water demand, as well as environmental and socio-economic conditions will also affect this sector. Modeling predicts that climate change will affect the optimal areas for the country's major tree crop

species, and impact on the marginal costs associated with planting in sub-optimal areas.

- **Biodiversity** is important for South Africa because of its key role in maintaining ecosystem functioning, its proven economic value for tourism and its role in supporting subsistence lifestyles. Climate change modeling suggests a reduction of the area covered by the current biomes by up to 55% in the next 50 years. The largest losses are predicted to occur in the western, central and northern parts of the country. Species composition is expected to change, which may also lead to significant changes in the vegetation structure in some biomes, and, in some extreme cases, even leading to total species loss. With regard to animal taxa, climate modeling predicts that most animal species will become increasingly concentrated in the proximity of the higher altitude eastern escarpment regions, with significant losses in the arid regions of the country. Some species are predicted to become extinct.
- **Marine** biodiversity is not expected to be impacted by the predicted ranges for rise in sea level. However, the predicted rise in sea surface temperature would result in the migration of species residing along the coast. Further, the changes in sea temperature may increase the intensity and frequency of upwelling events. This would cause alterations of near-shore currents, which can be expected to have the most significant impact on rocky shore ecosystems in South Africa. The nutrient and larval supply to the coast would be affected, thus influencing the community structures. In addition, studies have indicated that there would be an increase in the occurrences of the harmful 'red tide' events on the west coast which cause mass mortalities of fish, shellfish, marine mammals, seabirds and other animals, and can result in illness and death in persons who eat contaminated seafood.

South Africa's response to climate change risks

In August 1997, RSA ratified the United Nations Framework Convention on Climate Change (UNFCCC). The government has designated the Department of Environmental Affairs and Tourism (DEAT) to be the lead department responsible for co-ordination and the implementation of South Africa's commitments and related matters in terms of the Convention. The National Committee on Climate Change (NCCC) was established to act as an advisory body to the Minister of Environmental Affairs and Tourism. Representatives from relevant government departments, as well as representatives from business and industry, mining, labor, community based organizations and non-governmental organizations constitute the NCCC.

RSA submitted its first National Communication to the UNFCCC in October 2000. The total greenhouse gas emissions for 1990 were 347 346 Gg CO_2 equivalents and 379 842 Gg CO_2 equivalents for 1994. The total emissions for each sector, calculated as carbon dioxide equivalents show that the:

- energy sector contributed 75% of the total emissions in 1990, and 78% in 1994;
- agriculture contributed 11.6% of the total emissions in 1990, and 9.3% in 1994;
- industrial processes contributed 8.9% in 1990, and 8.0% in 1994; and,
- waste contributed 4.4% in 1990, and 4.3% to the total emissions in 1994.

South Africa established its National Designated Authority (DNA) for the Clean Development Mechanism (CDM) on 24 December 2004. The DNA is established within the Department of Minerals and Energy (DME). South Africa has two registered CDM projects:

- Project 0079: Kuyasa low-cost urban housing energy upgrade project, Khayelitsha (Cape Town; South Africa). This was South Africa's first CDM project and was registered by the CDM Executive Board on 27 August 2005. It was the first African CDM project to be registered by the UNFCCC CDM Executive Board.
- Project 0177: Lawley Fuel Switch Project South Africa. Registered on 6 March 2006. This project entails the conversion from coal to natural gas of the thermal fuel used in

clay brick-baking kilns at Lawley Brick Factory, a brick factory wholly owned by Corobrik (Pty) Ltd, South Africa.

According to the DNA, there are 54 CDM projects submitted to the DNA to date - 34 Project Idea Notes (PINs) and 20 Project Design Documents (PDDs). Out of 20 PDDs, 10 have been registered by the CDM Executive Board as CDM projects, 3 are requesting registration and 7 are at the validation stage. Only 1 project was rejected by the DNA. The projects submitted to the DNA for initial review and approval cover the following types, bio-fuels, energy efficiency, waste management, cogeneration, fuel switching and hydro-power, and cover sectors like manufacturing, mining, agriculture, energy, waste management, and housing and residential.

South Africa is now in the process of preparing a national greenhouse gas mitigation plan that will be presented to the Cabinet. South Africa is a non-Annex I country and is therefore not required to meet any specific emission reduction or limitation targets. Work on a National Adaptation Plan of Action (NAPA) has not yet started.

2. ASSESSMENT OF AREAS FOR COOPERATION WITH THE BASIS IN THE CURRENT PORTFOLIO OF THE EMBASSY

2.1 Introduction

The Embassy supports a number of activities which are climate sensitive and which should be considered at risk.

In the following chapters a menu of possible actions are presented that the Embassy should consider to strengthen the climate change and environmental component of the supported projects and programs. The Embassy needs to carefully review the suggestions and decide on the appropriate course of action. Some of the recommendations can be easily addressed without major resource implications (within existing agreements and budgets). Other recommendations will have resource implications for the Embassy and need to be carefully assessed in the Embassy's follow-up plan to the Review.

The Review Team has provided its' independent recommendations and this does not indicate any commitment on behalf of the Embassy to provide additional funding. It should also be noted that since this a Desk Review the Review Team did not have access to all relevant information. Therefore, the recommendations should be considered as preliminary.

2.2 Support to the Energy Sector

Goals and Activities

The main goal of the Energy Program is to promote the South African energy sector. The program includes the following sub business plans and institutional contracts:

- Petroleum agency of South Africa (PASA) and NPD;
- Energy Development cooperation (EDC) and NVE;
- National Energy Regulator (NERSA) and NVE;
- Department of Energy (DME) and NVE; and
- Department of Energy (DME) and NPD

It is further decided that the above program shall focus on the following 3 themes:

- Energy planning;
- Climate change; and
- Regulation

Norway is also supporting regional energy initiatives as RERA, SAPP and SADC:

- RERA is a regional association of regulators in the region (Embassy Pretoria);
- SAPP and Nordpool are organizations with many similarities and a capacity building program between SAPP and Nordpool is established (Embassy Harare); and
- Norway is for the time being leading the energy donor group in SADC (Embassy Maputo). A long time adviser, based in Maputo, is recruited to fill this position.

Climate Change and Environmental Issues Addressed in the Program/Project

Special emphasis has been given to climate change issues in the Energy Sector Program. The above EDC – NVE agreement is of special interest in this respect. This includes focus on CDM, mini-hydro development and mapping of wind and solar power potential. The budget for this agreement is however limited to approximately NOK 2 million.

The following activities in the EDC – NVE agreement are of special interest:

- Workshop on Wind (Scheduled for march/April 2008);

- CDM capacity building;
- Assessment of hybrid Mini-Hydro, wind and solar generation (in progress followed up on seminar march/April 2008);
- Training in small hydro development;
- Mapping of wind potential; and
- Bankable studies on hydro power sites

Potential Climate Change Issues to be Considered

For South Africa, issues of energy strategy are in themselves essential to the tasks of sustainable development. Fossil fuels and coal in particular, represent both an important natural resources and the backbone of the electricity generation sector. For domestic reasons, issues of coal in the future pipeline of energy provision, will be of interest in terms of environmental and climate change implications. In foreign policy and trade as well, the role of coal and the treatment of greenhouse gas emissions will be of great importance.

Reduced emissions can be achieved in the following areas:

a) Reduce the need for energy; energy efficiency and demand side management;
b) Reduced emissions from existing coal fired power plants;
c) Improved technology for new power plants to reduce emissions; and
d) Change in the electricity supply mix towards more energy for clean energy sources.

Although the current energy cooperation addresses key issues related to climate change there is a potential to increase the focus. Some options are presented in the following:

- **Energy and Climate Change in a Regional Perspective:** The long-term solutions to the energy and climate challenges will require increased regional cooperation. The capacity for transmission of electricity in the region has been expanded and the system for trade of energy between the countries is improved by the development of SAPP (reference is made to the present cooperation between Nordpool and SAPP). Solution of the climate change challenge should therefore be looked more in a regional than a country wise prospective. A coal fired power plant in RSA could, e.g. be replaced by a hydro installation in Mozambique or Congo. A transmission and trading possibility in the region can make the use of energy more efficient and reduce the need for new power plants in RSA. There will also be a need to consider how carbon trading can be an element in this even though all countries in the region are Non-Annex I countries. Regardless the carbon market will make new and additional sources of finance available. There is a need to develop further the regulatory framework for regional energy trading. The regional prospective is ,however, at this stage of the study not taken into consideration and needs to be covered at a later stage. The newly appointed regional energy coordinator and planned increase in staff working on energy/climate/environment issues needs to be involved in this.

- **Energy Strategy**: The energy sector is the largest contributor to emissions of GHGs. In general, South Africa's energy infrastructure has suffered from a lack of investment in the last decade, with the result that increasing demand is rapidly outstripping supply. Resulting brown- and black-outs are resulting in serious financial losses and hardships.

  The majority of SA's energy requirements are met by coal, with huge power stations on the internal plateau close to coal mines and the Johannesburg-Pretoria metropolis. ESKOM is the second largest GHGs-emitting utility in the world. The mitigation of greenhouse gases can be undertaken in many ways, including, inter alia, the introduction of renewable energy resources, fuel switching and energization, domestic and industrial efficiency programs, energy efficient housing, transport, agricultural

and forestry schemes and non-biological carbon sequestration. As the South African economy is particularly dependent on coal, diversification measures that reduce this dependency will be important. Such actions will require a comprehensive technology needs analysis to be undertaken for South Africa. Norway is not very well positioned to support activities in this area, except for CCS.

There is a need for RSA to develop an energy strategy with an environment/climate perspective. Environmental co-benefits of the energy policy will be important in this regard. RSA is now preparing a national mitigation strategy and it is envisaged that this strategy will have this perspective. However, the Embassy should consider to bring up the issue in their dialogue with RSA and to follow the discussions on the mitigation strategy closely.

South Africa has prepared a biofuels strategy and the final strategy will be concluded before the end of the financial year after all issues that were raised during the consultation process have been extensively debated and addressed. Consideration of key environmental and climate change impacts of the biofuels strategy needs to be undertaken.

- There are Norwegian institutions with considerable experience in developing integrated energy and climate change strategies, most notably CICERO, SSB, SFT and NVE which have worked on issues of air pollution, energy efficiency, household fuel use, etc. in developing and middle income countries.

- **Renewable Energy:** RSA is endowed with a potential for renewable, such as solar and wind and also to some extent hydro power. Further focus on micro solar would help provide services to the extensive rural communities without the cost of establishing power grids. Some experiences are achieved with wind and the resources are foreseen to be developed. Wind is especially relevant in the western part of the country and also in Namibia north of the boarder to RSA. Further mapping of the wind potential is necessary to identify sustainable projects and it is also necessary to identify necessary hydro power linked to the wind projects to function as regulation capacity.

  Hydro is a possibility and a potential is identified in projects that originally were built for irrigation.
  - NVE is assisting in assessing this potential ranging to approx 30 MW; and
  - Norfund has also identified hydro potential in the Eastern Cape region that will be further investigated in cooperation with the RSA authorities.

  A challenge is that many South Africans, especially the vulnerable groups, have limited access to energy to meet their thermal needs. Even when they have electricity, they continue to use low-grade coal and paraffin for heating and cooking. Uptake and use of new modern energy technologies is therefore a challenge, especially in rural areas.

- **Carbon Capture and Storage (CCS):** CCS is an approach to mitigate global warming by capturing CO_2 from large point sources such as fossil fuel power plants and storing it instead of releasing it into the atmosphere. Technology for large scale capture of CO_2 is already commercially available and fairly well developed. Although CO_2 has been injected into geological formations for various purposes, the long term storage of CO_2 is a relatively untried concept and as yet no large scale power plant operates with a full carbon capture and storage system. Storage of the CO_2 is envisaged either in deep geological formations, in deep ocean masses, or in the form of mineral carbonates.

The DME has already undertaken a study to ascertain the potential for carbon storage. The outcome of that report was that South Africa has a potential to store carbon dioxide, and that the most appropriate source for the first investigation would be the 30 million tones per year of 95% carbon dioxide emitted by Sasol.

There seems to be scope for research and commercial cooperation between RSA and Norway on CCS-related issues. Although South Africa has no carbon capture and storage projects underway, it has technical expertise in various sub-categories required for such a project. These expertise areas include: (a) Gasification of coal and gas (Sasol and PetroSA); (b) Transport of large volumes of gas via pipeline; (c) Geology; and (d) Drilling (CLSF 2005).

CCS, in the context of South Africa's climate change strategy, could be part of an agenda to facilitate the transition from a coal-dependent energy system to a more diversified one, making the coal "cleaner," but there is a need to conduct further studies on how CCS compares to other mitigation and sequestration options in terms of costs and long-term sustainable development benefits.

- The Embassy should keep relevant authorities in RSA informed about CCS development, just as it would be of importance to Norway to examine how these developments are being viewed from the business/energy/technology perspective in South Africa; and
- Research cooperation between the University of Cape Town and SINTEF in Norway could be a possibility, as well as commercial cooperation.

- **Clean Development Mechanisms – Carbon Neutral Norway:** The Norwegian Ministry of Finance is authorized by the Storting (Parliament) to contract delivery of carbon credits (Certified Emission Reductions (CER) from CDM. The combined authorization and appropriation for 2008 is NOK 4.1 billion, or about 500 million Euros. The Ministry plans to contract some 30 to 35 million tons for delivery during 2008-2012.

  The Ministry invites project proponents to submit offers on a regular basis.
  - The Embassy should provide the DNA and potential project developers with updated information on CarbonNeutral Norway's activities; and
  - Norad could assist Norwegian project proponents in developing CDM-eligible projects.

Conclusions and Recommendations

- ***Climate Risk Assessment: 1 – High risk****. The energy sector is the main source of GHGs and can also be potentially affected by climate change, e.g. changes in temperature increasing the demand for cooling, reduction in runoff affecting access to cooling water and production at hydro power plants. There is therefore a need to consider the climate change impacts of interventions in the sector.*

- *The present support to the energy sector through the existing five agreements is very relevant when it comes to environment and climate change in RSA. The program is a good basis for increased support to this sector. Further development of the energy sector program should be based on the specific needs of RSA and Norwegian comparative advantages (funding capacity, hydropower development, wind and solar, demand side management, efficient operation of energy systems, CDM).*

- *The agreement with EDC has special relevance in this respect. The other four agreements focus to a larger extent on capacity development and improved energy management which more indirectly has relevance for the climate change issue. Relevant actions that could be considered:*

- *NVE – EDC agreement: Follow up and support the ongoing activities in the NVE – EDC cooperation (present budget approximately 2 mill) regarding:*
  - *Development of mini hydro sites (potential approx. 30 MW);*
  - *Wind mapping and investment planning;*
  - *Further assessment of solar potential; and*
  - *CDM capacity building.*
- *Energy Policy and the present DME - NVE/NPD agreements. Consider enhanced focus on climate change in this agreement on a strategic/ policy level and also consider operational actions.*
  - *Environmental co-benefits of energy policy. A possible partner in this respect can be CICERO.*
- *Hydro potentials Eastern Cape. Follow up on possible hydro potentials in the Eastern Cape region, identified by Norfund.*
- *DSM and transmission efficiency. Consider possible cooperation between ESKOM and Statnett to optimize use of the existing grid and achieve mutual benefits for the both organizations.*

- *RSA is a strategic partner for Norway in international climate change fora and Norway and RSA are maintaining a high level dialogue on these issues. The high level dialogue at the Ministerial level should continue and preferably be expanded. The South African Minister of Energy visited Norway in August 07 and used the opportunity to strongly emphasize the common interest for climate change issues in the two counties.*

- *The Embassy should provide the DNA and potential project developers with updated information on CarbonNeutral Norway's activities and act as a broker between project developers and CarbonNeutral Norway. Norad could assist Norwegian project proponents in developing CDM-eligible projects. Furthermore, the Embassy and Norad could consider supporting CDM capacity building activities.*

- *The Embassy should assess further the potential for research cooperation between RSA and Norway on CCS. Relevant institutions: University of Cape Town and SINTEF and also potential commercial cooperation.*

- *The Embassy should consider to undertake a more comprehensive and detailed study to assess the scope for strengthening the climate change and energy cooperation between RSA and Norway. Norad could assist in facilitating such a study.*

2.3 Environment

Goals and Activities

The bilateral cooperation on environmental issues is covered by the Business Plan (BP) "Environmental Cooperation Programme 2005-2010". The agreement partner is DEAT. The BP was signed in 2005 and the financial frame is NOK 40 mill. The funds are allocated for three themes; (i) Pollution and Waste, (ii) Biodiversity and Conservation and (iii) Environmental Governance

The Program goal is to promote sustainable development through the protection and conservation of natural resources, safeguard of the environment from pollution, and enhancing the quality of the environment.

The main purpose of the Program:

- South African national, provincial and local governments, are effectively implementing their mandates for environmental management in the following areas: Pollution and waste, and Biodiversity;

- A platform has been created for long-term and sustained environmental cooperation between Norway and South Africa;
- Sub-regional, regional and global environmental co-operation is enhanced; and
- Contribution to meeting the millennium development goals and the Johannesburg Plan of Implementation targets.

The program's key outputs/deliverables are:

- Improved institutional capacity within the prioritized thematic areas;
- Prioritized robust environmental management structures in place;
- Effective prioritized environmental management systems (including law) in place;
- Prioritized strategies to meet environmental objectives in place;
- Efficient and effective intergovernmental cooperation in place;
- Efficient and effective institutional cooperation between South Africa and Norway; and
- Efficient and effective cooperation between South Africa and sub-regional, regional and global partners.

Climate Change and Environmental Issues Addressed in the Program/Project

All activities are relevant. The second phase of the Environmental Cooperation Programme between South Africa and Norway commenced in 2000. The cooperation had seven themes: climate change, cultural heritage, environmental rights and justice, biodiversity and water, pollution and waste, and weather services. In the present phase commencing in 2005 this was reduced to only three themes and Climate Change was not one of these.

The program has been instrumental in supporting DEAT in delivering on its key focus areas and has provided DEAT with an opportunity to strengthen its capacity in the management and conservation of the environment.

Potential Climate Change Issues to be Considered

In the following paragraphs the Review Team offers suggestions for how climate change can be strengthened within the existing program's three priority themes. Furthermore, the Review Team offers some suggestions for new activities.

Environmental Governance

Theme goal: South African national, provincial and local government effectively implements their mandates for environmental management.

- **Environmental Impact Assessment and Climate Change**. In order to take climate change into consideration, the environmental assessment of development programs and projects will have to address not only the effects on the environment, but also the impacts that imminent climate-related environmental and socio-economic changes have on the project. Therefore, climate change needs to be addressed along with economic, social, and environmental risk factors and be included in the EIA. Investments, must be 'climate proof ', i.e. must be protected from negative impacts of climate change, climate variability, and extreme weather events. Potential impacts on greenhouse gas emissions (GHG) should also be considered. The current cooperation between RSA and Norway focuses on development of legislation and capacity building at national and provincial level. A primary focus has been on energy projects in the cooperation and this should be continued. Further cooperation should cover both assessments of how a project adds to climate change and how it should be modified to reduce its negative implications, as well as how expected climate change requires adaptation of projects.

- **International Environmental Governance (IEG), including climate change**. Norway and RSA participate actively in the international dialogue on IEG. The current focus on climate change and the need to strengthen international cooperation on climate change compounds the need to strengthen the dialogue.
    - Cooperation between DEAT and the Norwegian MoE could enhance the development of joint positions and enhance greater understanding between RSA as a BRIC-country and a member of G77 and the north. Climate change could be a key issue in these discussions;
    - Closer cooperation between UNFCCC delegations should also be explored. RSA is a key country in climate change negotiations and one of major voices of developing countries, including BRIC-countries; and
    - International climate policy: examining possible future developments in international treaties (SA is signatory to Kyoto, but without emission caps for the first commitment period).

<u>New activities to be considered:</u>

- **Green budgeting**: In 2007, DEAT initiated a project - the Green Budget Project - to identify, formulate and introduce appropriate economic instruments to support sustainable development. The first phase of the Green Budget Project culminated in a report in November 2007 that outlined options and opportunities for environmental fiscal reform. Based on this report, the Minister of Finance in his 2008 budget speech made particular mention of proposed measures in favor of enhancing energy efficiency. Tax incentives for cleaner production technologies and reform of the existing vehicle taxes to encourage fuel efficiency are also being considered. However further in-depth research and design is needed before any proposals can be fully implemented. The task now is to conduct in-depth research on proposed fiscal interventions, and to identify and develop additional market-based instruments to achieve environmental goals and promote sustainable development.

  DEAT, jointly with National Treasury will embark on a second-phase of further research and design, with the aim of identifying and prioritizing a package of proposed environmental taxes and user charges for implementation. There are a number of strategically important areas that require further research and policy development before fiscal mechanisms can be finalized. Proposed areas of focus include: Biodiversity, including marine issues; Air pollution and climate change; Energy taxes and subsidies for renewable energy; Incentives for new technologies; Aligning the MTEF with sustainable development priorities; Further research on the fuel levy and incentives for bio-fuel; Integrating energy efficiency into new and low income housing programs; Cleaner production; and Waste, including hazardous waste. The overall goal of the Green Budget initiative is to identify and implement least-cost market-based instruments to achieve environmental goals and promote sustainable development.
    - Although there are existing climate change relevant components of the Green Budget Project Norwegian entities could help to strengthen this dimension. Several Norwegian institutions have experience that could be of value to RSA on these issues, including MoF, MoE, SSB and SFT.

- **Institutional Cooperation on State of the Environment Reporting**: The main purpose of proposed cooperation is to assist DEAT to produce vital graphics based on the State of the Environment (SoE) reports. Climate Change is a part of this, but with no special emphasis. It would be possible to focus more of this work towards climate change, to make special graphics on climate change or to arrange journalist workshops aimed climate change. The following new elements could be included in the cooperation between DEAT and GRID-Arendal:

- Cooperation around the Global Adaptation Information Network (GAIN). GRID-Arendal is the Secretariat of this network; and
- GRID-Arendal is developing a sub-program directed to assist UNEP in developing its Climate Change Adaptation Programme through capacity building on integrated planning and preparedness to sea level rise with the aim of integration into national Integrated Coastal Zone Management policies and plans. The focus of this sub-program is suggested to be placed on developing countries of the Western Indian Ocean region (Somalia, Kenya, Tanzania, Mozambique, South Africa, Madagascar, Comoros, Seychelles and Mauritius) using the partner and users network already established in the region.

The outcomes for this sub-program foreseen for the coming two years are:

- Review and asses the potential impacts of sea level rise on vulnerable systems, sectors and localities in coastal zones of the region; and
- Asses the needs and gaps in data, information and capacity in developing countries of the region.

Production of national or even local scale assessments to help in the planning towards preparedness and adaptation to sea level rise combined with capacity building of the can be a continuation and extension of this program.

Biodiversity

Theme Goal: Promote the conservation and sustainable development of South Africa's natural resources.

- **Assessing the Impact of commercially released GMOs on the environment:** Climate change issues is not highlighted as an issue in the project BP, but it is highly relevant because the challenges related to biological pollution from GMOs is increasing due to the increased drive towards production of GM crops like sugarcane, maize, soya and canola for agrofuel. In 2007, South Africa published a draft Biofuels Strategy which proposed to replace 4.5 % of South Africa's liquid road transport fuels with agrofuels through mandatory blending. Civil society organizations in South Africa have condemned the strategy. One reason for this is the concern that the Strategy will provide the impetus for more GM varieties to be pushed through South Africa's – at least up to now – quite relaxed regulatory regime and in doing so increase the risks for human health and the environment.

  The project as it is planned today will establish a general monitoring system for adverse effects of GMOs. The monitoring as well as the experimental and modeling parts of the project may, and should, include the unpredictable effects that climate changes may have on GMO and environment interactions.
  - Norwegian partners DN and GenØk.

New activities to be considered:

- **Reducing Emissions from Deforestation and Forest Degradation (REDD):** South Africa has one of the largest man-made forestry resources in the world, utilizing 1.5% of the cultivated land. Plantations cover approximately 1,4 million ha of South Africa. Indigenous forests cover a very much smaller area of approximately 0,5 million ha (0.5% of land area). Savannas contribute the bulk of the wooded land area of South Africa, and are characterized by a co-dominance of trees and grasses. Depending on how woodlands are classified the area in South Africa ranges between 29 million and 46 million hectares (about 21% of land area) (DWAF, 2007). Forests and woodlands

are crucial to the protection and conservation of the soil, and play a vital part in water and carbon cycling.

Approximately 8% of South Africa has been invaded by alien vegetation, and millions of hectares are affected by bush encroachment. The introduction of alien plant species has serious implications for water availability. South Africa's forestry plantations use about 3% per annum of the available surface water, while alien plants consume 7% of the available surface water per annum.

Currently the issue of REDD is not discussed to a large extent in RSA. The potential is also marginal compared to other African countries. The Forest Sector Growth Strategy provides for the afforestation of more than 100 000 hectares over the next ten years, mostly in the Eastern Cape and KwaZulu-Natal (DWAF 2007). This could be considered as a carbon sequestration project. There is also a need to develop more heat and drought resistant hybrids, which would allow the forestry industry to counter the threat of climate change and also to maintain current production areas. However, it should be noted that current commercial forests in RSA make extensive use of exotic species, a practice that may influence biodiversity and other climate change sensitive factors such as excessive water use and soil properties.

Forest growth modeling suggests that if the climate changes to the degree predicted, and if no action is taken to select and plan heat tolerant cultivars, there will be substantial loss of production in the core area of current forestry, thereby causing loss in carbon sequestration and resulting in increased emissions.

- **Elephant culling**: The high number of elephants in Kruger national park is not sustainable and is threatening the whole ecosystem. The elephants' main diets are trees and shrubs, and the elephants are slowly changing the ecosystems from woodland/bushland to deforested areas that might end up as a desert if no action is taken. South-Africa has an intention to open up the fence between the Kruger and Limpopo national park in Mozambique, but this has only been done to a very small extent because the establishment of the national park on the other side of the border is still in the process, and there are still many villages inside the proclaimed national park. Elephant culling might then be the only viable option to save the Kruger ecosystem. This is a highly sensitive issue for the South African authorities. But if Norway is approached to financially support the culling operation through the environmental program the REDD-effect of this should also be taken into account. But more important for South Africa might be Norwegian support to South Africa when they will bring the case in for CITES in order to possibly obtain an export license to sell the ivory (to Japan).

Pollution and Waste

Theme Goal : South African national, provincial, local governments are effectively implementing their mandate for environmental management in pollution and waste.

- **Make climate change a focus of all relevant activities**. In general, the activities under this component have not been designed specifically to address climate change relevant issues. Several of the activities are clearly relevant and climate change relevant issues can easily be integrated. Most of the activities have **co-benefits,** i.e. reducing air pollution, improving public health and reducing emissions of GHGs. Air pollution is a major problem in South Africa for a variety of reasons, but particularly in urban areas as a result of domestic coal use. This can affect all sectors of the population and many people are subjected to excessive air pollution levels for their entire lives, with the resultant toll on health and productivity. Much can be done to alleviate

the situation and many of the possible solutions also have benefits regarding the emissions of greenhouse gases.

- **Hazardous waste strategy**. Currently, there is little focus on climate change relevant substances. A clear focus on climate change relevant issues should be pursued in the execution of the program.
- **Municipal Waste**: Cooperation with municipalities of Port Elizabeth and Buffalo City. Organic waste constitutes a large share of the waste. The project aims to reduce the waste amount. Climate change impacts are not explicitly addressed. There is a need to highlight the climate change benefits of composting of organic waste.
- **Compliance monitoring**. Focus on compliance with air pollution and waste regulations and permits. Sharing of knowledge and lessons learned. Focus on capacity building in DEAT. Again, a clear focus on climate change could be included in the execution of the program As DEAT is already setting controls on emissions to atmosphere, it is a relatively simple task to include greenhouse gas emissions under the same umbrella. The same is true regarding the issue of demonstrating compliance with any regulations that may be promulgated for greenhouse gas emissions.
- **GHGs Inventory**. The air pollution information handling system will also act as an ideal platform for drawing up the necessary greenhouse gas inventory reports for periodic submission to the UNFCCC, and the system should be designed from the outset to accommodate both greenhouse gas and air pollution data.

Conclusions and Recommendations

- ***Climate Risk Assessment: 2 – Partial risk**. Ecosystems services will be impacted by climate change resulting in social, economic and environmental consequences.*

- *Initiate a dialogue with DEAT and the National Treasury on potential cooperation on green budgeting. A number of Norwegian institutions could, if required, provide technical assistance through institutional cooperation.*

- *The Embassy should at annual meetings and in other settings, as appropriate, request institutions involved in environmental cooperation to address climate change specifically within the various sub-projects. This can for most activities easily be accomplished within the existing agreements, business plans and budgets. Examples can be found within all three themes included in the current program:*
  - *Cooperation on EIA should include climate change as an issue;*
  - *Within biodiversity climate change impacts on biodiversity should be considered, as well as assessing climate change impacts on the use of GMOs; and*
  - *In nearly all pollution and waste sub-projects climate change relevant issues can be included.*

- *REDD. The Embassy should inform DWAF and DEAT about the Norwegian REDD initiative and urge South Africa to include REDD-related issues in the mitigation and adaptation strategies. Areas of potential cooperation could also be explored, especially in terms of estimating the carbon benefits of afforestation and protection of forests in savannas.*

2.4 Marine Fisheries Cooperation

Goals and Activities

The goal of the program is to promote sustainable utilization of South Africa's marine and coastal resources to enhance economic growth and poverty reduction. The Program has the following key focus areas:

- Promote the conservation and sustainable utilization of natural resources to enhance economic growth and poverty reduction;
- Protect and improve the quality and safety of the environment;
- Promote a global sustainable development agenda; and
- Transformation.

The program is coordinated by DEAT, Branch Marine and Coastal Management.

Climate Change and Environmental Issues Addressed in the Program/Project

The program has a strong environmental focus since it includes activities related to sustainable use of natural resources, conservation of biodiversity, building a sound scientific base for effective management of natural resources, prevention and reduction of marine pollution and ensuring proper compliance with Environmental Management Systems.

Currently, no specific direct climate change related activity is included in the program.

Potential Climate Change Issues to be Considered

Fisheries will be affected by climate change, primarily through changes caused by rise in sea temperatures and currents affecting migration patterns, species composition, nutrient situation, etc. The current program does not take climate change issues directly into account.

The Norwegian Institute of Marine Research (IMR) has proposed a project idea entitled "Effects of climate change on marine biodiversity, fisheries management in tropical waters, and community livelihoods". Based on data collected through the "Nansen programme" and other available and relevant data – the project aims to analyze and clarify possible trends in ocean climate and corresponding changes in marine biodiversity in tropical waters and design of future monitoring systems, with a first focus on the Benguela Region. The consequences for fisheries management and livelihoods of the coastal communities are the long term objectives of this study, which may indicate risks involved in the impact of climate change.

South Africa is an active partner in the Benguela Current Commission and has its own research vessels and is therefore centrally placed to take the lead in putting climate change on the agenda to fisheries and environmental management entities. In the Benguela region, the combined oceanographic and biodiversity database collected through the Nansen programme is potentially the main source of local data covering climate change and its effect on marine resources in the last 30 years. However, its contributions to the understanding of climate change effects on the Benguela ecosystem are rather limited so far, because the environment data available in the databases of the national institutions from the cruises with R/V "Dr. Fridtjof Nansen" are raw data that still needs to be analyzed. This dataset together with national datasets in RSA therefore offers a great opportunity to assess to what extent long-term climatic and oceanographic changes have occurred and could form a baseline for future monitoring efforts.

The Embassy, supported by Norad and other Embassies in the region (Luanda), could offer to co-host a joint seminar involving representatives from key research and government insti-

tutions within the Benguela Current and South Africa with a view to establishing a common platform for a joint undertaking of a comprehensive research program addressing impacts of climate change on the marine environment based on the data collected through the Nansen program. FAO needs to be actively involved in the preparation of a possible seminar (FAO is now the responsible entity for the Nansen program).

Conclusions and Recommendations

- ***Climate Risk Assessment: 2 – Partial risk****. There is a need to strengthen the long-term capacity to monitor impacts of climate change on the marine environment and more specifically on fish stocks. Further cooperation in this sector should consider climate change as an issue, and a partial risk assessment should be undertaken.*

- *The Embassy should in its dialogue bring up the issue of climate change and request the cooperating parties to include specific priority activities related to climate change and long-term impacts on fisheries.*

- *Jointly with the Embassy in Luanda and Norad, the Embassy could co-host a seminar on establishing a common platform for a joint undertaking of a comprehensive research program addressing impacts of climate change on the marine environment based on the data collected through the Nansen program and South African datasets for the Benguela Current.*

2.5 Education and Research

Goals and Activities

The Education and Research component has two main activities:

- South Africa Norway Tertiary Education Development Programme (SANTED). SANTED supports strengthening of the higher education system nationally and in the region. At a national level SANTED projects have a primary focus on improving throughput and graduation rates generally in universities, in the context of the huge wastage produced by high drop-out rates and lengthy times to completion. In the SADC region, the focus is on developing the capacity of partner universities to offer qualifications (mainly at postgraduate level) in key areas where these have not been offered before.; and
- South Africa Norway Programme on Research Cooperation with a main focus on establishing direct research cooperation and exchange between South African and Norwegian researchers. The primary instrument is joint research. The Norwegian Research Council is the key Norwegian counterpart.

Climate Change and Environmental Issues Addressed in the Program/Project

The Research Programme has environment with main emphasis on aquatic research and polar research as a thematic focus areas, as well as energy with emphasis on renewable and sustainable energy sources and socio-economic impacts. 9 joint environment research programs have been approved and one energy program.

Potential Climate Change Issues to be Considered

Climate change is a relatively new issue in South Africa. Education, training and public awareness thus lag behind. The following activities are suggested:

- **Education and training needs analysis**. DEAT could undertake a climate change needs analysis for education and training requirements, together with the National Department of Education (DoE). Certain tertiary education establishments could be selected to develop, or extend, 'centers of excellence' in environmental education, specifically including climate change and sustainable development, to ensure continuity of the education process. This could also be encouraged in privately funded institutions.
- **Incorporation of climate change in curricula**. Climate change activities should be incorporated into educational curricula at primary, secondary and tertiary levels, in order to broaden public awareness of the issue. In this regard climate change needs to be seen as an integral part of modules on the environment and sustainable development.
- **Give priority to climate change relevant research cooperation**. The Program on Research Cooperation should give additional priority to climate change relevant research. Polar research is already a priority, an area which is climate change relevant. Additional climate change relevant topics should be considered both within the environment and the energy component. Development of low-carbon technology could also be considered as a thematic area, including CCS. Several climate change relevant projects have been submitted for consideration.
- **Support to establish a South African Climate Change Research and Policy Programme:** Various universities, government departments, and research institutions are actively involved in monitoring programs and research projects closely related to the issues of climate change in South Africa. Types of research activities include - modeling of climate systems, mitigation activities, identifying the vulnerability of South Africa to climate change, and adaptation. These projects and activities provide a valuable information and evidence base. However, what is lacking is a national coordinated climate change research agenda and strategy to drive and shape policy responses and actions.

  DEAT considers establishing a national Climate Change Policy Research Programme, which brings together a network and interdisciplinary team of South African scientists, researchers and other stakeholders. The program is a partnership program, which will include other relevant government departments and research institutions. The overall goal is to provide a coherent and comprehensive evidence-base and develop a national coordinated response and set of strategies to address the impacts of climate change in South Africa. A National Climate Research Programme will also serve to provide coordination and deliberations on the climate challenge in South Africa. The first step will be to develop a coherent national climate research agenda (based on identified priorities) and strategy to cover issues related to impact and adaptation. Such a strategy will map and build on existing research and development activities, identify information gaps, and establish research and policy priorities. Suggested research priority areas are: Climate change adaptation strategies: Medium and long-term options; Tracking climate impacts on key sectors - energy, agriculture, biodiversity, water; Climate risk management, including developing tools for climate risk management; and Climate change and sustainable development.
    - **Cicero** could be a potential Norwegian cooperation partner in establishing a South African sister institution.
    - Norad's budget line for institutional cooperation could be a source of finance.
- **Continue Student Exchange program**: The pilot programme that finances scholarships for South African students enrolled in Master's degree programs at their home

institution to take courses in Norway as parts of their degree should be continued. Emphasis could be given to institutions that offer climate change relevant international courses.

Conclusions and Recommendations

- ***Climate Risk Assessment: 3 – No risk****. There is no need to undertake risk assessment of climate change issues within this area of cooperation.*

- *The Embassy should encourage DEAT to undertake a climate change needs analysis for education and training requirements.*

- *At the Annual Meeting for the SANTED program the Embassy should bring up the issues of climate change and encourage the program to develop and give priority to climate change relevant issues where appropriate, e.g. inclusion of climate change in curricula, developing specific training courses on climate change, etc.*

- *The Embassy should request the research councils to consider giving priority to climate change relevant research cooperation. Additional climate change relevant topics should be considered both within the environment and the energy component. Development of low-carbon technology could also be considered as a thematic area, including CCS.*

- *The Embassy should consider supporting the establishment of a South African Climate Change Research and Policy Programme. Cicero could be an institutional partner in this. Norad's budget line for institutional cooperation can be used to support this activity.*

2.6 Support to NGOs

Within the existing support through Norwegian NGOs (from the SIVSA allocation) no environmental or climate change related projects are supported in South Africa. The Norwegian environmental NGOs have traditionally not been very active towards South Africa. The most relevant future support for Climate Change through this channel would be through WWF-Norway since WWF South Africa has lifted Climate Change and Energy as one of its main priorities.

South Africa's position as an emerging economy in the African region makes it a natural focus of concerted lobbying of government and business by NGOs. Through support to NGOs these can seek to engage, mobilize and catalyze domestic policy and action. This work will include in-country capacity building, the development of a "value proposition" for South Africa's participation in the new global climate deal, and to build political will to support that participation.

Norad is at the moment financing funding mechanism for support to capacity building of environmental NGOs in developing countries. The Norwegian Environmental NGOs WWF, Utviklingsfondet and Regnskogsfondet are the Norwegian implementing partners. This could be a source of funding for South African NGOs.

The Embassy is now in dialogue with IUCN-ROSA with the aim of supporting a regional Biodiversity programme. Norad has not had the time or capacity to assess the IUCN proposal from a Climate Change perspective, but a program like this gives opportunities to produce outputs giving possible co-benefits for biodiversity, human development and climate change.

3. RECOMMENDATIONS AND NEXT STEPS

Based on the Desk Review the following observations are offered to the Embassy:

- **Portfolio at risk**. The sectors included in the current cooperation between South Africa and Norway are to various degrees subject to climate change risk. Energy sector cooperation, both at national as well as at the regional level, is clearly subject to climate change risks, as well as the fact that emissions from the energy sector are the largest source of GHG emissions in South Africa.
- **Considerable scope for increased focus on climate change within the existing development cooperation portfolio**. As documented by this Desk Review there are opportunities within all sectors the Embassy is supporting to increase emphasis on climate change relevant issues. This can be done within the existing framework (agreements, business plans and budgets (partly)) of the cooperation.
- **Possibility do strengthen the 'do good' components of the existing cooperation.** There are environmental elements in several of the projects supported and there is scope to increase efforts to "do good". Within all sectors there is a possibility to strengthen the focus on environment and include activities more focused on environment. However, it should be noted that environment is well addressed in all reviewed sectors.
- **'Do no harm'**. It has not been possible to ascertain whether some of the activities included in the portfolio should have been subject to environmental impact assessment (EIA). The Review Team has furthermore not been in a position to assess to what extent the Embassy has addressed environment as a cross-cutting and sustainability issues in Appropriation Documents (ADs).
- **Include climate change and environment actively in all policy and project dialogue with South Africa**. South Africa, as a BRIC and a G77 member, has considerable influence in international discussions and negotiations on climate change and environmental issues. Based on the existing development cooperation the Embassy is well positioned to expand the dialogue between Norway and South Africa.
- **Adaptation – the missing leg**! Primary focus has been on mitigation of climate change. South Africa is developing a mitigation strategy and has not yet started preparing an adaptation strategy. The Embassy should in its dialogue consider to bring up the issue of adaptation more specifically, even though this might distract some attention to the question of acceptable emission reduction obligations. However, regardless of the outcome of international climate change negotiations, there will be a need for adaptation.
- **Energy sector cooperation is vital and until CCS is commercially available GHG emissions from the sector are likely to increase**. According to the draft Annual Letter to the Embassy climate proofing of the development cooperation portfolio entails that all energy-related programs should not increase emissions of greenhouse gases (GHGs). South Africa faces serious challenges in the energy sector and needs to develop more generation capacity urgently, even though the potential for energy efficiency has not yet been explored in full. Enhanced generation of electricity will inevitably lead to increased GHG emissions regardless of the source of energy (from a lifecycle perspective). How to offset the increasing emissions could be an issue to be considered.
- **Clean Development Mechanism offers possibilities.** South Africa is the leader in Africa in using the CDM. South Africa has a potential for attracting CDM financing for projects within bio-fuels, energy efficiency, waste management, cogeneration, fuel switching and hydro-power, and within the manufacturing, mining, agriculture, energy, waste management, and housing and residential sectors. CarbonNeutral Norway is a potential purchaser of CERs from these projects and the Embassy should

actively work as a broker between project developers/proponents and CarbonNeutral Norway. Norad could support this process if Norwegian developers are involved.

The Desk Review has offered a menu of potential actions the Embassy could consider in strengthening the focus on climate change in the portfolio. The key suggestions are:

Energy Sector:

- **Climate Risk Assessment: 1 – High risk**. The energy sector is the main source of GHGs and can also be potentially affected by climate change, e.g. changes in runoff. There is therefore a need to consider the climate change impacts on interventions in the sector.
- The present support to the energy sector through the existing 5 agreements are very relevant when it comes to environment and climate change in RSA. The program is a good basis for increased support to this sector. Further development of the energy sector program should be based on the specific needs of RSA and Norwegian comparative advantages (funding capacity, hydropower development, wind and solar, demand side management, efficient operation of energy systems, clean development mechanisms).
- RSA is a strategic partner for Norway in climate issues in international fora and Norway and RSA are maintaining a high level dialogue on these issues. The high level dialogue at the Ministerial level should continue and preferably be expanded.
- The Embassy should provide the DNA and potential project developers with updated information on CarbonNeutral Norway's activities and act as a broker between project developers and CarbonNeutral Norway. Norad could assist Norwegian project proponents in developing CDM-eligible projects. Furthermore, the Embassy and Norad could consider supporting CDM capacity building activities.
- The Embassy should assess further the potential for research cooperation between RSA and Norway on CCS. Relevant institutions: University of Cape Town and SINTEF and also potential commercial cooperation.

Environment:

- **Climate Risk Assessment: 2 – Partial risk**. Ecosystems services will be impacted by climate change resulting in social, economic and environmental consequences.
- Initiate a dialogue with DEAT and the National Treasury on potential cooperation on green budgeting. A number of Norwegian institutions could, if required, provide technical assistance through institutional cooperation.
- The Embassy should at annual meetings and in other settings, as appropriate, request institutions involved in environmental cooperation to address climate change specifically within the various sub-projects. This can for most activities easily be accomplished within the existing agreements, business plans and budgets. Examples can be found within all three themes included in the current program:
  - Cooperation on EIA should include climate change as an issue;
  - Within biodiversity climate change impacts on biodiversity should be considered, as well as assessing climate change impacts on the use of GMOs; and
  - In nearly all pollution and waste sub-projects climate change relevant issues can be included.
- Reducing emissions for deforestation and forest degradation (REDD): The Embassy should inform DWAF and DEAT about the Norwegian REDD initiative and urge South Africa to include REDD-related issues in the mitigation and adaptation strategies. Areas of potential cooperation could also be explored, especially in terms of estimating the carbon benefits of afforestation and protection of forests in savannas.

Fisheries:

- **Climate Risk Assessment: 2 – Partial risk**. There is a need to strengthen the long-term capacity to monitor impacts of climate change on the marine environment and

more specifically on fish stocks. Further cooperation in this sector should consider climate change as an issue, and a partial risk assessment should be undertaken.

- The Embassy should in its dialogue bring up the issue of climate change and request the cooperating parties to include specific priority activities related to climate change and long-term impacts on fisheries.
- Jointly with the Embassy in Luanda and Norad, the Embassy could co-host a seminar on establishing a common platform for a joint undertaking of a comprehensive research program addressing impacts of climate change on the marine environment based on the data collected through the Nansen program and South African datasets for the Benguela Current.

Education and Research:

- **Climate Risk Assessment: 3 – No risk**. There is no need to undertake risk assessment of climate change issues within this area of cooperation.
- The Embassy should encourage DEAT to undertake a climate change needs analysis for education and training requirements.
- At the Annual Meeting for the SANTED program the Embassy should bring up the issues of climate change and encourage the program to develop and give priority to climate change relevant issues where appropriate, e.g. inclusion of climate change in curricula, developing specific training courses on climate change, etc.
- The Embassy should request the research councils to consider giving priority to climate change relevant research cooperation. Additional climate change relevant topics should be considered both within the environment and the energy component. Development of low-carbon technology could also be considered as a thematic area, including CCS.
- The Embassy should consider supporting the establishment of a South African Climate Change Research and Policy Programme. Cicero could be an institutional partner in this. Norad's budget line for institutional cooperation can be used to sup-port this activity.

Contribution to Fulfilling Climate Change Obligations: Through the existing development cooperation portfolio and a stronger emphasis on climate change Norway could make a significant contribution to assisting RSA in meetings its obligations as a party to UNFCCC. As a party to the UNFCCC South Africa has to fulfill certain obligations which include the following:

- Prepare and periodically update a national inventory of greenhouse gas emissions and sinks:
  - The Green Budgeting and the air pollution information handling system could be major contributions to this obligation.
- Formulate and implement national and, where appropriate, regional programs to mitigate climate change and facilitate adequate adaptation to climate change.
  - Climate change has to be addressed at a regional level. Through the Norwegian support to regional energy cooperation Norway is well positioned to assist in including climate change in this cooperation through the use of trading and carbon markets, when the parties are ready.
  - Climate change will have a major impact on scarce water resources, resulting in changes in rainfall, runoff patterns and increasing competition among water users. Southern Africa's water challenges can only be solved through a regional approach. The close cooperation between RSA and Lesotho is one example and the cooperation on transboundary watercourses as the Limpopo and Orange Rivers are other examples. Norway could consider to support regional transboundary water resources programs. This could be included as part of regional energy, e.g. hydropower, cooperation.

- Promote and cooperate in the development, application and diffusion of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases.
    - In this area Norway could make a major contribution to the development and diffusion of CCS technology.
- Promote sustainable management, and promote and cooperate in the conservation and enhancement of sinks and reservoirs of all greenhouse gases.
    - The Norwegian REDD initiative could potentially play a role here, even though it is not very likely that RSA will be a key cooperation partner in this initiative.
- Cooperate in preparing for adaptation to the impacts of climate change.
    - South Africa will embark upon preparation of national adaptation plans. The Embassy could indicate its readiness to support this activity, however, support can also be sourced from UNEP/UNDP to this activity (partly supported through the GEF). South Africa should also be encouraged to prepare specific adaptation projects to be considered by the Adaptation Fund. Both South Africa and Norway are represented on the Board of the Adaptation Fund.
- Take climate change considerations into account in the relevant social, economic and environmental policies and actions with a view to minimizing adverse effects on the economy, on public health and on the quality of the environment.
    - Efforts to include climate change in national and regional energy policies and projects and programs could be a major contribution to ensure mainstreaming of climate change in key policies and development plans.
- Promote and cooperate in scientific, technological, technical, socio-economic and other research, systematic observation and development of data archives related to the climate system and intended to further the understanding and to reduce or eliminate uncertainties.
    - Support to the establishment of a national climate change research institute and institutional cooperation with CICERO (which could be funded over Norad's budget line) should be considered.
- Promote and cooperate in the full, open and prompt exchange of relevant scientific, technological, technical, socio-economic and legal information related to the climate system and climate change.
    - CCS cooperation could be a major contribution to enhancing technological cooperation.
- Promote and cooperate in education, training and public awareness related to climate change.
    - By focusing the research cooperation on climate change and including climate change in SANTED important contributions can be made.

Next steps. It should however be noted that the Review Team when undertaking the Desk Review did not have sufficient access to updated information on the scope of the existing dialogue between Norway and RSA on issues related to climate change.

- It is therefore recommended that the Embassy considers undertaking a more detailed study on the potential for further cooperation based on the suggestions provided in this report. Norad in close cooperation with the Ministry of Foreign Affairs could facilitate this.
- In this study effective dialogue with South African and Norwegian stakeholders should be established.

Annex I

References: (to be updated)

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Annex II

Key environment indicators

South Africa

Population (millions)	46.9	Land area (1,000 sq. km)	1,214.5	GDP ($ billions)	239.5

	Country data	Sub-Saharan Africa group	Upper middle-income group
GNI per capita, *World Bank Atlas* method ($)	4,770	746	5,634
Urban population (% of total)	59.3	35.2	72.0
Urban population growth (average annual %, 1990–2005)	2.8	4.0	1.2
Population growth (average annual %, 1990–2005)	1.9	2.5	0.8
Agriculture			
Agricultural land (% of land area)	82	44	26
Irrigated land (% of cropland)	9.5	3.6	9.6
Fertilizer consumption (100 grams/ha arable land)	654	139	469
Population density, rural (people/sq. km of arable land)	129	373	139
Forests and biodiversity			
Forest area (% of land area)	7.6	26.5	37.2
Deforestation (average annual %, 1990–2005)	0.0	0.6	0.1
Nationally protected area (% of land area)	6.1	11.3	9.6
Mammal species, total known	320		
Mammal species, threatened	29		
Bird species, total known	829		
Bird species, threatened	36		
GEF benefits index for biodiversity (0–100, 100=maximum)	23.5		
Energy			
GDP per unit of energy use (2000 PPP $/kg oil equivalent)	3.7	2.8	3.7
Energy use per capita (kg oil equivalent)	2,829	703	2,583
Energy from biomass products and waste (% of total)	10.0	55.7	4.0
Electric power consumption per capita (kWh)	4,885	550	3,454
Electricity generated using fossil fuel (% of total)	93.2	75.8	70.1
Electricity generated by hydropower (% of total)	0.9	19.5	18.3
Emissions and pollution			
CO_2 emissions per unit of GDP (kg/2000 PPP $ GDP)	0.8	0.4	0.7
CO_2 emissions per capita (metric tons)	7.9	0.8	6.4
CO_2 emissions growth (%, 1990–2003)	21.6	21.4	-14.2
Particulate matter (urban-pop.-weighted avg., µg/cu. m)	26	64	36
Passenger cars (per 1,000 people)	92	..	142
Water and sanitation			
Internal freshwater resources per capita (cu. m)	955	5,229	13,701
Freshwater withdrawal			
Total (% of internal resources)	27.9	3.1	4.0
Agriculture (% of total freshwater withdrawal)	63	87	54
Access to improved water source (% total population)	88	56	94
Rural (% of rural population)	73	43	82
Urban (% of urban population)	99	80	98
Access to improved sanitation (% of total population)	65	37	84
Rural (% of rural population)	46	28	66
Urban (% of urban population)	79	53	91
Environment and health			
ARI prevalence (% of children under age 5)	19.0		
Diarrhea prevalence (% of children under age 5)	13.2		
Under-five mortality rate (per 1,000 live births)	68	163	27
National accounting aggregates			
Gross savings (% of GNI)	14.4	17.4	23.4
Consumption of fixed capital (% of GNI)	12.0	10.7	11.4
Education expenditure (% of GNI)	5.3	3.8	4.5
Energy depletion (% of GNI)	4.8	15.5	14.4
Mineral depletion (% of GNI)	1.2	0.8	0.8
Net forest depletion (% of GNI)	0.2	0.3	0.0
CO_2 damage (% of GNI)	1.1	0.7	0.8
Particulate emission damage (% of GNI)	0.1	0.5	0.5
Adjusted net savings (% of GNI)	0.3	-7.3	-0.1

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