SOUTH AFRICAN NATIONAL STRATEGY STUDY ON THE CLEAN DEVELOPMENT MECHANISM

EXECUTIVE SUMMARY

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Prepared for
The South African Department of Environmental Affairs and Tourism and
The World Bank

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EXECUTIVE SUMMARY

In September 1997, Switzerland and the World Bank launched a Collaborative Initiative on National Strategy Studies on Activities Implemented Jointly (AIJ)/Joint Implementation (JI) and the Clean Development Mechanism (CDM) to provide support for potential host countries to develop the necessary expertise to identify and take educated decisions on their participation in these developing Greenhouse Gas (GHG) offset mechanisms. This South African study is one of the studies in the second phase of the NSS Programme.

INTRODUCTION AND OVERVIEW

The overall aim of the United Nations Convention on Climate Change and the Kyoto Protocol of the Convention is to reduce human induced climate change through reducing the emissions of GHGs. The Protocol commits parties defined in Annex B to the Protocol (mainly developed countries) to quantified emission reductions. Existing differences between countries in the cost of reducing a 'unit' of GHGs provides the rationale for the so-called 'flexibility mechanisms' under the Kyoto Protocol which are designed to allow Annex B countries to seek the lowest cost GHG reduction options - even if these options are in another, non-Annex B, country.

Because there are a considerable amount of low-cost emission reduction options in non-Annex B countries there is demand for a mechanism that allows the industrialised countries to move part of their abatement efforts to developing countries. The CDM is the mechanism established for this purpose. The CDM has the dual aims of assisting developing countries to achieve sustainable development while reducing GHG emissions, and assisting industrialised countries in achieving their commitments under the Kyoto Protocol.

Under the CDM developing countries will benefit from GHG abatement projects taking place in their countries through increased investment, technology transfer and possibly a share in the benefits arising from the projects. The projects will generate so-called certified emission reductions (CERs) corresponding to the achieved GHG emission reductions. The industrialised country partners may use the CERs accruing from such project activities to contribute to compliance with part of their emission reduction commitments under the Protocol.

The CERs are the 'currency' of the mechanism and they have value to investors because they are less costly to acquire than GHG reductions would be in the investor's home country. The CERs are valuable to host country partners because they are a commodity which they sell to the investor in return for technology, capital investment in projects, or direct financial returns.

The CDM is a project based mechanism through which two or more partners jointly develop a project that reduces GHG emissions. There are two ways in which a CDM project can reduce GHG emissions. A project can either reduce currently occurring emissions from a particular activity or ensure that the emissions from a future activity are less in the presence of the project than they would have been without the CDM project.

THE POTENTIAL FOR CDM PROJECTS IN SOUTH AFRICA - REDUCTION OPTIONS

South Africa's involvement in the CDM depends largely on the GHG reduction options that are available in the country. These include both the scale of reductions, in other words how many tons of GHGs can be reduced per year, and the cost of such reductions. This information is difficult to gather, and is not available for the whole economy. Mitigation options covering six sectors of the South African economy have been identified through a South African Country Study in support of the
country’s national communication to the UNFCCC. These studies have gone some way towards identifying available mitigation options and their results are discussed below.

It has been recognised that further work needs to be done to provide the country with the level of information required to make a thorough assessment of the potential GHG reduction options and their costs to the economy. This additional research will also provide greater insight into the availability of CDM opportunities. In particular the industrial and transport sectors have been identified as requiring further investigation. Certain sectors not yet researched, such as waste management and the mining sector, also require investigation. An important recommendation of this study is that the required research is undertaken to improve the understanding of reduction options in the country. This will significantly contribute to engagement with the CDM.

An overview of the country's GHG emissions profile is provided which gives insight into the major emitting sectors of the economy and hence where reductions are likely to be found. This is followed by a review of some of the key findings of the mitigation studies.

**SA Emissions Profile**

The GHGs addressed in the South African inventory prepared for the country's national communication are carbon dioxide (CO2), methane and nitrous oxide for the years 1990 and 1994. The inventories were prepared in accordance with to the 1996 Intergovernmental Panel on Climate Change (IPCC) Guidelines (RSA, 2000).

The total GHG emissions for 1990 were 347.3 MtCO2 equivalents and 379.8 MtCO2 equivalents for 1994. The total emissions for each sector, calculated as CO2 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 (See Figure 1 below).

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1 South Africa’s National Communication will be submitted to the UNFCCC and will then be publicly available. The six sectoral studies under the SA Country Studies programme (listed below) are not yet publicly available. Once they are finalised and ready for publication they will be available from the Department of Environmental Affairs and Tourism:


CO₂ is the most significant GHG for South Africa. It contributed more than 80% of the total of the three GHG emissions for both 1990 and 1994. The main source of CO₂ emissions was from the energy sector, which generated 89.7% of the total CO₂ emissions in 1990 and 91.1% of the total CO₂ emissions in 1994. The high level of emissions from the energy sector relates to the high energy intensity of the South African economy, which is dependent on large scale primary extraction and processing, particularly in the mining and minerals beneficiation industries. The high emission levels also relate to the fact that the bulk of electricity production is from coal-fired generation and that emissions intensive coal-to-oil conversion is carried out.

The only significant sink for CO₂ in South Africa is through afforestation. At present South Africa is undergoing net afforestation and the net uptake of CO₂ through afforestation activities increased from 17 MtCO₂ in 1990 to 18.6 MtCO₂ in 1994.

Methane emissions from agriculture, energy fugitive emissions and waste amounted to 2.1 Mt (equivalent to 44.1 MtCO₂) in 1990 and 1994. Enteric fermentation emissions from livestock were the largest contributor to methane emissions, contributing 40% of the total methane emissions. The waste sector contribution increased from 33.5% in 1990 to 36% in 1994 due to the extension of waste services to sectors of the population that were previously not provided with a waste management service.

**Emissions Projections**

The results obtained from the analysis of sectoral emission reports were used to estimate future GHG emissions if the status quo in energy usage and production methods was sustained. In other words a “business-as-usual” scenario. The results of this study will be used for further research into different mitigation options to determine the effectiveness of different combinations thereof.

Where applicable, these studies gave estimations of different GHG’s emitted in the specific sector as a result of production processes, direct emissions as a result of energy usage and indirect emissions as a result of energy usage. Some studies gave energy emissions as a total and as a result the indirect energy emissions had to be removed at a later stage. As well as the specifics on different types of gases emitted a CO₂ equivalent, which was used for the duration of the study, was also given. Estimated production levels were also provided.

The estimated sectoral emissions were then adjusted based on a Computable General Equilibrium (CGE) model, called IDC GEM, run by the Industrial Development Corporation (IDC) for the period 2000-2015. The estimates in production growth given in the mitigation studies and the result of the IDC GEM were reconciled. Because growth rates obtained from the model differed from those used in the studies, total emission forecasts per sector were adjusted to be more in line with industry
forecasts. Emission factors (CO\textsubscript{2} equivalent emissions per unit of production) were calculated and new emission volumes were generated which were in line with production growth forecasts model.

The IDC model outputs also had to be adjusted to take into account unavailable information. Information on energy related emissions were not available for all of the sectors in a format suitable for inclusion in the IDC model. The most prominent omission is the agricultural sector for which no suitable data was available from the study and the gold mining sector, which was not included in the mitigation studies. Where required the adjustments to indirect emissions were also made. After the various adjustments an overall national emissions projection was generated (see Figure 2) (where one Gg is equal to 1000 MtCO\textsubscript{2}). Figure 3 shows the adjusted emissions data per sector from 2000-2015.

**Figure 2. National Emissions Projection (2000-2015): based on IDC modelling**

![National Emissions Projection](image)
Figure 3. Adjusted energy emissions data (IDCGEM forecasts)
CDM Project Supply

Early CDM projects are likely to focus on low cost credits as well as following traditional investment patterns. The mitigation studies identified a number of negative or low cost options. A review of the mitigation studies suggests that the range of estimated emission reductions that may be achievable at reasonable cost through CDM projects is between 20 MtCO$_2$ to 25 MtCO$_2$ per year (see Figure 4). This is approximately 5% of the current GHG emissions from the country. At least one half of these reductions would seem to be from projects that would be of interest to private sector investors. The balance may be more suited to institutional investors such as the World Bank’s Prototype Carbon Fund. It is likely that with more detailed examination of specific projects the emission reductions available would increase.

Table 1 below lists (in order of ascending cost/ton of CO$_2$ mitigated) those mitigation options that have been both identified as clearly possible mitigation options and for which costs per ton of CO$_2$ abated have been evaluated. It should be noted that a wide-range of other options have been identified (as discussed above) but that the ones in the table are those for which both amounts and costs have been evaluated with some degree of certainty.

Not all of the options identified are suitable as CDM options. For example, the two individual GHG abatement options with the greatest reduction potential are a switch from coal-fired electricity generation to nuclear generation. However, there is significant debate as to whether nuclear projects will be accepted as CDM projects. In addition, those projects which have significant negative costs (i.e. positive returns) may well fail to meet the additionality test discussed later.

A third issue which may reduce the total available CDM projects is that some of the projects identified are mutually exclusive or else simultaneous implementation will affect the overall GHG reductions gained. For example, a switch from current energy use to natural gas in the commercial sector will reduce some of the positive impacts of a switch to solar water heating in the same sector. The simultaneous implementation of these projects would also serve to make the cost per ton of CO$_2$ higher than it would be if the projects could be implemented without affecting each other.
### Table 1. Abatement Options and their Likely Costs

<table>
<thead>
<tr>
<th>SECTOR</th>
<th>PROJECT</th>
<th>AMOUNT (MTCO2) OVER 30 YRS</th>
<th>CO2/ANNUM (MTCO2)</th>
<th>COST (R/ton CO2)</th>
<th>COST (US$/ton CO2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal Mining</td>
<td>Combustion of discard coal</td>
<td>23.6</td>
<td>0.79</td>
<td>-875.0</td>
<td>-116.7</td>
</tr>
<tr>
<td>Commercial</td>
<td>Energy star equipment</td>
<td>9</td>
<td>0.30</td>
<td>-202.0</td>
<td>-26.9</td>
</tr>
<tr>
<td>Commercial</td>
<td>Lighting retrofit</td>
<td>21</td>
<td>0.70</td>
<td>-161.0</td>
<td>-21.5</td>
</tr>
<tr>
<td>Commercial</td>
<td>New lighting systems</td>
<td>16</td>
<td>0.53</td>
<td>-160.0</td>
<td>-21.3</td>
</tr>
<tr>
<td>Commercial</td>
<td>VSDs for fans</td>
<td>16</td>
<td>0.53</td>
<td>-159.0</td>
<td>-21.2</td>
</tr>
<tr>
<td>Commercial</td>
<td>HVAC retrofit</td>
<td>41</td>
<td>1.37</td>
<td>-153.0</td>
<td>-20.4</td>
</tr>
<tr>
<td>Commercial</td>
<td>Efficient new HVAC systems</td>
<td>50</td>
<td>1.67</td>
<td>-152.0</td>
<td>-20.3</td>
</tr>
<tr>
<td>Commercial</td>
<td>Elec to natural gas</td>
<td>18</td>
<td>0.60</td>
<td>-141.0</td>
<td>-18.8</td>
</tr>
<tr>
<td>Commercial</td>
<td>New building thermal design</td>
<td>80</td>
<td>2.67</td>
<td>-132.0</td>
<td>-17.6</td>
</tr>
<tr>
<td>Residential</td>
<td>Efficient use of hot water</td>
<td>22</td>
<td>0.73</td>
<td>-121.0</td>
<td>-16.1</td>
</tr>
<tr>
<td>Residential</td>
<td>Efficient lighting practices</td>
<td>18</td>
<td>0.60</td>
<td>-120.0</td>
<td>-16.0</td>
</tr>
<tr>
<td>Residential</td>
<td>Replace incandescents</td>
<td>11</td>
<td>0.37</td>
<td>-119.0</td>
<td>-15.9</td>
</tr>
<tr>
<td>Residential</td>
<td>Heat pumps for hot water</td>
<td>19</td>
<td>0.63</td>
<td>-104.0</td>
<td>-13.9</td>
</tr>
<tr>
<td>Land-Use</td>
<td>Reduced wildfires</td>
<td>22.2</td>
<td>0.74</td>
<td>-103.0</td>
<td>-13.7</td>
</tr>
<tr>
<td>Land-Use</td>
<td>Increased afforestation</td>
<td>116.1</td>
<td>3.87</td>
<td>-100.0</td>
<td>-13.3</td>
</tr>
<tr>
<td>Commercial</td>
<td>Heat pumps</td>
<td>20</td>
<td>0.67</td>
<td>-99.0</td>
<td>-13.2</td>
</tr>
<tr>
<td>Residential</td>
<td>Hot plate to gas cooking</td>
<td>5</td>
<td>0.17</td>
<td>-24.0</td>
<td>-3.2</td>
</tr>
<tr>
<td>Residential</td>
<td>Paraffin to gas cooking</td>
<td>2</td>
<td>0.07</td>
<td>-16.0</td>
<td>-2.1</td>
</tr>
<tr>
<td>Residential</td>
<td>Efficient wood/coal stove</td>
<td>5</td>
<td>0.17</td>
<td>-15.0</td>
<td>-2.0</td>
</tr>
<tr>
<td>Residential</td>
<td>Appliance labelling &amp; standards</td>
<td>25</td>
<td>0.83</td>
<td>-15.0</td>
<td>-2.0</td>
</tr>
<tr>
<td>Bulk Energy</td>
<td>nuclear (pebble-bed reactor)</td>
<td>1402</td>
<td>46.73</td>
<td>0.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Bulk Energy</td>
<td>nuclear (pressurised-water reactor)</td>
<td>1099</td>
<td>36.63</td>
<td>1.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Coal Mining</td>
<td>Catalytic combustion of methane</td>
<td>170.1</td>
<td>5.67</td>
<td>1.3</td>
<td>0.2</td>
</tr>
<tr>
<td>Bulk Energy</td>
<td>gas-coal substitution for synfuel feed</td>
<td>174</td>
<td>5.80</td>
<td>10.5</td>
<td>1.4</td>
</tr>
<tr>
<td>Residential</td>
<td>Insulation of geysers</td>
<td>25</td>
<td>0.83</td>
<td>13.0</td>
<td>1.7</td>
</tr>
<tr>
<td>Bulk Energy</td>
<td>super-critical coal</td>
<td>109</td>
<td>3.63</td>
<td>23.0</td>
<td>3.1</td>
</tr>
<tr>
<td>Bulk Energy</td>
<td>IGCC power generation</td>
<td>131</td>
<td>4.37</td>
<td>45.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Land-Use</td>
<td>Manure Management</td>
<td>49.8</td>
<td>1.66</td>
<td>65.0</td>
<td>8.7</td>
</tr>
<tr>
<td>Residential</td>
<td>Hybrid solar water heaters</td>
<td>88</td>
<td>2.93</td>
<td>84.0</td>
<td>11.2</td>
</tr>
<tr>
<td>Commercial</td>
<td>Fuel to natural gas</td>
<td>13</td>
<td>0.43</td>
<td>124.0</td>
<td>16.5</td>
</tr>
<tr>
<td>Residential</td>
<td>Elec to gas space heating</td>
<td>25</td>
<td>0.83</td>
<td>129.0</td>
<td>17.2</td>
</tr>
<tr>
<td>Residential</td>
<td>Solar water heaters</td>
<td>2</td>
<td>0.07</td>
<td>198.0</td>
<td>26.4</td>
</tr>
<tr>
<td>Commercial</td>
<td>Solar water heating</td>
<td>22</td>
<td>0.73</td>
<td>213.0</td>
<td>28.4</td>
</tr>
<tr>
<td>Residential</td>
<td>Distributed wind generation</td>
<td>0</td>
<td>0.00</td>
<td>222.0</td>
<td>29.6</td>
</tr>
<tr>
<td>Residential</td>
<td>Solar home system</td>
<td>2</td>
<td>0.07</td>
<td>351.0</td>
<td>46.8</td>
</tr>
<tr>
<td>Residential</td>
<td>Thermally efficient housing</td>
<td>9</td>
<td>0.30</td>
<td>723.0</td>
<td>96.4</td>
</tr>
<tr>
<td>Coal Mining</td>
<td>improved mining operations - ash-filling</td>
<td>0.63</td>
<td>0.02</td>
<td>4000.0</td>
<td>533.3</td>
</tr>
</tbody>
</table>

Total 3861.43 128.71

In Figure 4 the same options have been graphed to show the so-called abatement cost curve of CDM options. For the purposes of this graph the unlikely CDM projects discussed above have been excluded (such as nuclear projects). Projects with a net benefit of more than $5/ton CO₂ as well as projects with a cost greater than $20/ton CO₂ have also not been included in the
graph (those excluded are shown in italics in the table). Note that mutually exclusive options have *not* been removed from the graph. The impact of the combined implementation of different options (say a simultaneous reduction in the GHG intensity of electricity generation and an increase in residential energy efficiency) can only be determined by modelling that scenario. Further modelling of this type is still to be done by the IDC.

The dotted line on the graph has been included to provide an indication of which options are likely to be marketable as CDM projects. The line indicates $11, which is seen as the likely middle-estimate of the future market price for CERs (see chapter 3 of main report). Projects at a greater cost than $11 may face difficulties in selling their CERs.

As mentioned above, projects with a net benefit of more than $5 have not been included in the graph as these projects may face difficulty in qualifying as CDM projects. Although the range of -$5 to $11 is based on fairly broad assumptions it provides a sense of the options currently identified, available and likely to qualify for the CDM. As indicated above this suggests approximately 25 MtCO₂ of CDM project options per year.

**Figure 4. Abatement Costs for CDM Options**

It would seem that there are sufficient low cost options in South Africa for CDM supply to ensure that South Africa meets the demand for CERS facing the country (this is discussed in more detail below). More information on the sub-sectors where possible CDM projects have been identified, and the types of CDM options identified, can be found in Chapter 2 of the main report.

**INTERNATIONAL DEMAND FOR CDM PROJECTS**

The scale of South Africa's involvement in the GHG offsets market, through the CDM or other mechanisms, is a function of the amount of reduction options able to be supplied from South Africa; the cost of implementing these options; and the demand by other countries or firms for these reduction options. The relationship between these various elements of global
supply and demand; competition within the new offsets market; and local conditions will ultimately determine the nature of South Africa's involvement in this new 'commodity'.

The determinants of global GHG offsets demand are complex and the true size and nature of the market will only become apparent when more experience of the emerging offsets market becomes available. In the interim a number of different approaches can be used to provide an indication of the likely scope of the market. Because South Africa is a small country, relative to the world market for GHG or CO₂ reductions, the country will be a price taker in this market and the results of the world market assessments can therefore be readily applied to South Africa.

**Market size**

A number of different approaches have been used which show broadly similar results about the expected scale of the CDM market and the price range that CERs are likely to trade in. From an assessment of zero-price demand and more sophisticated economic models it appears that the total annual demand for offsets in the commitment period of the Protocol is likely to range from about 2 200 - 4 800 mtCO₂. Most analyses suggest that the market will tend towards the lower end of this spectrum, i.e. at about 2 200 - 2 800 mtCO₂ per annum.

This total market demand will not all be met through the CDM. There is likely to be some ceiling on the proportion of reductions that can be met through the CDM; JI and emissions trading will account for some of the demand; and 'hot air' and other factors may account for a further proportion of the demand. Once these issues are taken into account the estimates of the likely size of the CDM market range from about 400 - 2 600 mtCO₂ per annum (with some outlying values based on various assumptions on CDM ceilings and 'hot air'). The average estimates of the CDM market size of a selection of studies reviewed is 1 487 mtCO₂ per annum in the commitment period. It is likely that the market will be approximately this size.

The predictions of CER price range from US$4-18 per ton of CO₂ in 2010. While the range of possible market prices for CO₂ vary, the range is not large, especially given the variability in the assumptions used. Most importantly, the studies show very similar results when considering the impact of different assumptions or scenarios on the possible market price. The studies tend to show that:

- The smaller the demand the lower the price (and quantity traded)
- Restrictions on the use of flexible mechanisms will tend to lower the demand and the price
- The greater the use of hot air the higher the supply and the lower the price and the lower the proportion of funds flowing to the CDM
- Cartel formation amongst non-Annex B countries, or other supply restrictions such as slow project implementation, will tend to reduce supply and increase price.

**Other market issues**

Given the size of the market, and the dominance of large non-Annex B countries, South Africa will be a small player in the market and has to see itself as a fringe supplier and price taker. In other words South Africa will have to be able to supply CERs from CDM projects at or below the prevailing world price. The predicted dominance of some countries, such as China and India, in the CDM market will also have marketing implications for South Africa.

The non-price issues identified suggest that the negotiating ability of local project developers as well as other elements of South Africa's supply package (such as institutional readiness, risk profile and speed of project implementation) will affect the price that the country will be
able to command for its CDM projects. These factors can be seen as the ‘quality’ of the CERs that the country can supply.

Low risk projects, with clear emissions reductions and clear sustainable development benefits are likely to meet all future requirements of the Kyoto Protocol and hence will be high quality projects. The share of the market that South Africa will be able to claim will probably not be solely price-based but will depend on these other non-price factors identified.

**ATTRACTING AND MANAGING CDM INVESTMENTS INTO SOUTH AFRICA**

A functional CDM will create a new commodity market. The resulting CERs will have a price and, like other natural resource commodities, will require some investment to be produced. South Africa, as a non-Annex B country stands to benefit from this investment and from the subsequent sale or transfer of CERs. The market is likely to be competitive as South Africa holds no monopoly on the production of emission reductions.

To gain maximum benefit from the investments generated by the CDM will require South Africa to have the appropriate CDM projects, national investment conditions and facilitating institutions to attract international investment into local projects.

**Potential scale of CDM financial flows into South Africa**

Based on the mitigation studies reviewed, the estimated emission reductions that may be achievable at reasonable cost through CDM projects are in the range of 20 mtCO$_2$ to 25 mtCO$_2$ per year. On a *prima facie* assessment approximately one half of these reductions would seem to be from projects that would be of interest to private sector investors.

It would seem that there are sufficient low cost options in South Africa for CDM projects to ensure that South Africa attracts a proportion of CDM at least equal to, and preferably greater than, its current share of overall FDI (0.6%). If the country was faced with the same share of CDM demand as its share of world FDI it would result in South Africa facing a demand for CERs of between 2.4 mtCO$_2$ and 15.6 mtCO$_2$ per year. South Africa should be able to meet this demand without too many problems, and almost certainly should be able to offer investors opportunities in excess of this range. The table below shows in matrix form the range of the potential scale of financial flows from CER sales, based on estimates of CDM volume and CER price.

<table>
<thead>
<tr>
<th>CDM volume/Price</th>
<th>Million US$4</th>
<th>Million US$11</th>
<th>Million US$18</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.4 mtCO$_2$</td>
<td>9.6</td>
<td>26.4</td>
<td>43.2</td>
</tr>
<tr>
<td>9 mtCO$_2$</td>
<td>36</td>
<td>99</td>
<td>162</td>
</tr>
<tr>
<td>15.6 mtCO$_2$</td>
<td>62.4</td>
<td>171.6</td>
<td>280.8</td>
</tr>
</tbody>
</table>

The middle estimate from the table is US$99 million per annum, equivalent to about R750 million of sales of CERs per year. The value of the fixed investment underlying this is uncertain as for different projects the ratio of total fixed investment to CER production (i.e. the cost of CERs) will differ substantially.

These numbers need to be seen in the context of South African exports. Exports of $99 million of CERs would amount to about 0.4% of total South African exports (1999 figures) and 2.2% of the exports of manufactured goods.
Potential investors

An analysis of potential investor countries has identified a possible list of those countries which may become significant investors in CDM in South Africa (see table below). It is recommended that these be targeted to enhance South Africa’s success in attracting CDM investment.

<table>
<thead>
<tr>
<th>Country</th>
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<tbody>
<tr>
<td>France</td>
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<tr>
<td>Germany</td>
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<tr>
<td>Italy</td>
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<tr>
<td>Japan</td>
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<tr>
<td>Norway</td>
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<tr>
<td>Sweden</td>
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<tr>
<td>Switzerland</td>
</tr>
<tr>
<td>The Netherlands</td>
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<tr>
<td>UK</td>
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<tr>
<td>USA</td>
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</table>

CDM as an investment mechanism

The investment associated with CDM projects is potentially substantial and South Africa is well placed to attract this investment. The main report identifies a range of reasons why South Africa offers attractive CDM investment opportunities. These include economic and infrastructure reasons but also strongly focus on the institutional mechanisms which exist in South Africa to support inward investment. These institutions include the Department of Trade and Industry’s investment promotion agency, Trade and Investment South Africa, as well as non-governmental support institutions.

Given the current institutional structures, levels of awareness about CDM, and requirements for attracting CDM investment, it is likely that a new institutional arrangement or at least the co-ordination of capacity within existing institutions will need be established to effectively deal with CDM in the future. This rationale is based on experience in ordinary investment, which shows that countries with appropriate institutional infrastructure in place are more likely to attract capital than those who approach investment ad-hoc. Since the CDM will involve another layer of investment approvals and negotiation, which is in many ways more complex than ordinary FDI, dedicated CDM institutional capacity tasked with efficiently facilitating the investment process is likely to increase South Africa’s competitiveness in the CDM market. A defined CDM point of reference is also an indicator to investors of the relative importance of and preparedness for CDM in the host country.

Based on the benchmarked countries, two organisational models emerge regarding the location of the CDM investment promotion function. The first option is to locate the functional area within the government department responsible for trade, industry and economy, such as in the Netherlands and Switzerland. The alternative model is the location of the functional area within the government department responsible for environment, and specifically climate change, such as in Australia, Columbia and the UK. There are strong arguments, on capacity grounds, for locating the function of CDM investment promotion in an institution with already existing investment related expertise.
Irrespective of location, all the benchmarked countries include the establishment of a working and supportive relationship between the environmental and investment functions of government. Similarly, for South Africa, it is recognised that resource capacity may prove to be a significant challenge and that the lead department responsible for the CDM may have to outsource or partner with other institutional structures to execute some of functions efficiently and cost effectively.

In particular, to be successful there needs to be a partnership between the DEAT and the Department of Trade and Industry, probably including the DTI's Trade and Investment South Africa (TISA) agency, to avoid remoteness from the investor market. Relationships will also need to be maintained with the other key stakeholder groups such as business, labour and NGOs. The strengths of this approach are the likelihood of greater capacity (resources) and better access to potential CDM investors and understanding of their needs.

**REGULATORY, INSTITUTIONAL AND CAPACITY REQUIREMENTS**

Based on the assumption that in time the CDM will lead to significant investments in South Africa a programmatic approach to the implementation of the mechanism is warranted. There are three elements to a successful CDM programme:

- **Policy and regulation** - the development of the required policy and regulatory frameworks for active engagement with the CDM that supports national development objectives;
- **Capacity building activities** - the creation of the needed awareness, technological, institutional and managerial capacities in industry, industrial support services, NGOs, labour and government to create an ‘enabling environment’ for CDM projects.
- **Appropriate Institutions** - the design of appropriate institutions to efficiently manage the required elements of the CDM in line with national policy;

These three elements must be implemented in alignment with broader investment promotion efforts.

The analysis of current institutional capacity suggests that for effective involvement in the CDM the capacity of the national government must be expanded by an appropriate use and co-ordination of existing government (and non-governmental resources). Those institutions with already existing capacity should undertake appropriate functions of CDM management with some co-ordination from the mandated national government authority.

**The structure of CDM authority**

The National Strategy Study has evaluated the current institutional arrangements with regards to the CDM and has made some general recommendations about the appropriate structure and location of authority over the CDM in government. The NSS is not yet in a position, however, to make firm and detailed recommendations about future institutional arrangements. Agreement on such recommendations has not yet been reached within government nor within the stakeholder groupings whom government consults on climate change policy. Pending such agreement some general recommendations on future institutional arrangements can be made.

At present it is apparent that while adequate capacity may exist at the national government level to manage the CDM this capacity is not yet co-ordinated in a manner that will allow for effective engagement with the mechanism. In addition there are strong arguments for there to be at least some focal point for the CDM for investors or local project developers to engage with. Therefore even if many of the functions of the CDM are managed in an institution most
suited to that function there may well need to be a single authority with the mandate to a) co-ordinate the various CDM requirements and b) act as a focal point and channel for CDM project proponents.

Further work and consultation is required to establish the most effective institutional arrangement to address the above concerns. It is recommended that an assessment is carried out in the near future as to which authorities will be in a position to take on which elements of the CDM. Political discussions should also occur to ensure that an organisation has the mandate to ensure that the various management requirements for effective involvement in the CDM are in place and co-ordinated.

**Minimising transaction costs**

An over-arching principle of the institutional arrangements established to regulate and support the CDM should be the minimisation of transaction costs. The mechanism has substantial transaction costs associated with it such as search costs, approval costs, project development costs and risk mitigation. These costs already place the use of the CDM at a disadvantage to JI and emissions trading which avoid some of these costs. They also reduce the potential resources available for the developmental aspects of CDM projects.

Appropriate institutional arrangements and strategies must be designed to minimise transaction costs. For example search costs can be reduced through the support of investment promotion agencies; approval costs are reduced by efficient governmental structures and processes; and risk mitigation costs can be reduced through effective design of financing and through government support of projects. In the design and establishment of institutions the key transaction costs (and other barriers to project implementation) which need to be reduced should be identified.

**Criteria and Procedures for CDM Projects**

There are a number of formal requirements of CDM projects. The main requirements are that the CDM will: assist non-Annex B countries in achieving sustainable development; assist Annex B Parties in achieving compliance with their emission reduction commitments; have real, measurable and long-term benefits related to the mitigation of climate change; and be based on reductions in emissions that are additional to any that would occur in the absence of certified CDM project activities. The CDM is specifically established as a voluntary mechanism in pursuit of these goals (UNFCCC, 1998).

Although the Parties to the Convention currently hold many conflicting views on the final structure of the rules of the CDM there is sufficient clarity emerging to be able to assess the likely elements that will be involved in the mechanism, and in the development of specific CDM projects. The key formal elements that are likely to be required of a CDM project are shown in Table 4 below. Further details of these elements and their management are discussed in the main report.

**Table 4. Steps in the CDM Project Cycle**

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Explanation</th>
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<tbody>
<tr>
<td>Development of a project pipeline*</td>
<td>Identification of potential CDM projects at a broad level</td>
</tr>
<tr>
<td>Project selection</td>
<td>Selection by investors &amp; local developers of suitable projects</td>
</tr>
<tr>
<td>Project development &amp; feasibility study</td>
<td>Detailed development and analysis of the project (including development of a baseline and a monitoring and verification protocol)</td>
</tr>
<tr>
<td>Project Element</td>
<td>Explanation</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Negotiations</td>
<td>Negotiations between host and investor parties on the project structure and sharing of benefits (including preparation of contracts)</td>
</tr>
<tr>
<td>Project approval</td>
<td>Approval by the host (and possibly investor) governments</td>
</tr>
<tr>
<td>Project validation</td>
<td>External validation of key parameters of the project</td>
</tr>
<tr>
<td>Registration</td>
<td>Registering the project with the UNFCCC or CDM body</td>
</tr>
<tr>
<td>Project implementation</td>
<td>Financing and carrying out of the project</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Monitoring of project performance and GHG flows</td>
</tr>
<tr>
<td>Verification</td>
<td>Independent verification of monitoring data</td>
</tr>
<tr>
<td>Certification</td>
<td>Certification of GHG permits (rules still to be decided for CDM)</td>
</tr>
<tr>
<td>Issuance and use of credits (CERs)</td>
<td>The trade and transfer of certified credits</td>
</tr>
</tbody>
</table>

Notes: * - not formally required but a likely first step by many countries and project developers

There are also some areas of the mechanism, such as whether to participate in a particular project or not, that remain within the decision-making ambit of the host country. There are also a host of detailed implementation issues (some still outstanding) that will have to be dealt with by project developers. These include the determination of the baseline of the project and certain concerns about possible additionality requirements (in other words, whether there will be the requirement to prove that the project would not have occurred in the absence of the CDM).

Some brief conclusions are drawn for a CDM investment strategy for South Africa.

**Proactive Project Identification**

A thorough set of approval criteria will ensure that CDM projects which are in opposition to South Africa's sustainable development priorities will not be approved. However a rigorous project approval procedure at best can remove some projects that run counter to sustainable development objectives. This may be less important than actively identifying projects that will promote sustainable development and which would not occur in the absence of the CDM.

The proactive identification of projects that are likely to meet CDM criteria and that will offer the greatest collateral benefits to South Africa is the best way to ensure that the CDM provides developmental and environmental benefits to the country. Active government support for such projects can include capacity building in the priority sectors; partnerships between government and private developers; government preparation of projects; government support for preferred projects; and project portfolio development.

**Compliance Based Approval Criteria**

It is suggested that by and large South Africa has a well developed set of sustainable development principles; legislation governing sustainable development approaches; and well developed macro-economic and sectoral development policies, and that in this light the CDM approval criteria should be based on these pre-existing and commonly accepted principles and policies. This implies that CDM project approval will be conditional on project developers indicating how they are in compliance with these various sustainable development principles and the responsible arm of government applying its mind to whether the principles have been adhered to.

In addition to this bottom line compliance approach to the impact of CDM projects on sustainable development other criteria may be considered by government when approving CDM projects or imposing conditions on them. These would relate to issues such as an
assessment of whether local project partners are benefiting adequately; an assessment of the loss of cheap reduction options against future needs for these options; and whether the project entails an excessive loss of local sovereignty over domestic assets.

**Efficient Project Approval Process**

The final conclusion is that an efficient, transparent and rapid approval process which minimises transaction costs is critical for the success of the CDM in South Africa. The government should establish a clear approval process with well defined rules and guidelines. It is recommended that a guidance document is prepared for project developers and CDM investors outlining all the relevant approval criteria and describing the process to be followed for applying for approval.

A two stage approval process is recommended with:

- **a (voluntary) pre-approval stage** where the government will consider a draft project design document and give (or refuse) conditional or in-principle approval to a project idea (this would occur before the formal validation stage);
- **a final assessment stage** where final approval is given or withheld after, or as part of, the project validation.

Under voluntary pre-approval project developers could avoid this stage but run the risk of wasting high development costs if they fail to pass the final approval stage. Appropriate stakeholder involvement would occur at both stages if required by means of the stakeholder forums, such as the NCCC and its sub-committees, already established to consult on climate change issues.

Some issues around CDM project criteria and procedures remain to be resolved at the international and national level. These include the relationship of the CDM to current multilateral trade rules; the taxation of CDM projects; and other legal requirements. South Africa will have to keep abreast of developments in these areas, as clarity is only likely to emerge from practical experience of CDM project implementation.

**STRATEGIC AND POLICY ISSUES FOR SA’S ENGAGEMENT WITH THE CDM**

A range of strategic issues are raised by the CDM. These issues, and suggested local responses, are dealt with in the strategic issues chapter. The relationship of the CDM to domestic policies, legislation and development objectives is discussed. No conflicts between domestic legislation and the mechanism were identified although certain domestic policies could be modified to address climate change more directly.

The concern over the loss of cheap reduction options to CDM projects was addressed. In many respects this problem does not appear serious and there are a number of approaches to address the relevant concerns. Similarly the possible reasons to delay engagement with the CDM were evaluated and it is suggested that there are no sound reasons for South Africa as a country to prevent early engagement with the mechanism. The timing of market entry should be left to individual project participants.

**Strategic objectives**

Four strategic objectives towards ensuring successful engagement with the CDM have been identified. These objectives can be summarised as:
• Avoiding negative project impacts
• Developing appropriate institutional capacity
• Maximising collateral benefits
• Capturing adequate market share

Those components seen as critical in meeting the strategic objectives are briefly reviewed below.

**Establish Procedures and Guidelines for CDM Projects.** At present there are inadequate and inadequately defined procedures for the management of CDM projects. Effective management of the mechanism depends on clarity for all stakeholders. A relatively simple procedural approach for managing and approving CDM projects is recommended. The proposed procedure and related criteria should address the strategic objective of avoiding negative project impacts.

**Develop the Required Institutional and Capacity Requirements.** Annex B countries, or more particularly investors from those countries, will be looking for the most cost-effective opportunities to create CERs from CDM projects. One element of cost-effectiveness is the level of transaction costs necessary to secure the CERs. An issue of particular importance to investors is the efficiency of the procedure and hence the time it takes to approve the eligibility of a CDM project. Effective co-ordination of the institutions responsible for various aspects of the CDM will help streamline this process to the benefit of both the investor and South Africa.

A governmental or institutional 'focal point' which provides an entry point into the process of identification, approval and implementation of CDM projects will do much to keep transactions costs to acceptable levels. It is recommended that a single focal point for the CDM be established at the national level to act as an entry point to investors and to co-ordinate CDM related activities.

While a wide range of activities will be needed to be managed at the national level it is not recommended that a single department carry out all these activities. Due to capacity constraints and also so as to use the comparative advantage of existing institutions it is recommended that specialised functions of CDM management are 'out-sourced' to other appropriate government or other mandated institutions. It is also recommended that an assessment of national capacity and high level discussions take place to speedily resolve institutional management of the CDM.

**Identify Collateral Benefits and a Priority Project List.** It is recommended that projects which have specific collateral benefits be identified and promoted by government. While an approval process can ensure that undesirable projects do not occur it cannot ensure that those projects with significant benefits to the country are developed. Potential projects with high public benefits should be promoted and barriers to the development removed as far as possible. While the mitigation study has gone some way towards identifying suitable priority projects further research and other methods of project identification are required. This approach will address the third strategic objective of maximising collateral benefits.

**Market the CDM Internally and Externally.** The CDM is a new mechanism with complicated procedures and requirements. It also has not yet gained widespread exposure due to the ongoing negotiations over the final structure of the Kyoto Protocol. Nevertheless its potential importance warrants the development of awareness and capacity to respond to the mechanism as soon as it is formally established. In support of this a programme of internal awareness
raising and capacity building is required. Without the required internal understanding South Africa is unlikely to be able to offer sufficient CDM projects to the world market.

International marketing and investment promotion. As important as internal awareness is international marketing of the CDM. The approach to marketing South Africa's CDM opportunities is based on the view that the CDM is essentially the same as other foreign direct investment. The approach suggests that the investment promotion activities around the CDM be carried out by the appropriate investment agency of government, such as Trade and Investment South Africa. The chapter also suggests that South African developers and government interact with the emerging financial intermediaries in the CDM market.

It is also recommended that South Africa needs to present investors with a well prepared portfolio of CDM opportunities. These would offer investors insight into the range of CDM options available and would assist in linking general foreign direct investment to CDM investment. A well managed internal and external marketing approach will greatly assist in meeting the final strategic objective of ensuring that South Africa captures an adequate share of the CDM market.

**POSSIBLE CDM PROJECT PIPELINE FOR SOUTH AFRICA**

Potential projects have been identified at a broad level in order to stimulate stakeholders in the relevant sectors to initiate investigations to develop “bankable” projects. Potential projects are presented in different sectors

The lack of information on greenhouse gas emissions also extends to information on the potential cost of greenhouse gas emission abatement. The country studies and in particular the mitigation options played a major role in raising awareness in various sectors about the potential to abate greenhouse gas emissions.

Role-players in individual sectors have identified projects, which could contribute to the country’s overall sustainable development objectives while at the same time contributing to the establishment of credible CER’s.

A number of other organisations are investigating the potential for CDM projects. A comprehensive list of projects has been developed by the South South North Project (Thorne, 2001) and Climate Action Network South Africa is investigating potential projects.

This chapter is therefore not intended to be an exhaustive list of projects but rather serves to identify a range of potential project areas and contact organizations within South Africa, which could be approached by prospective project investors.

A list of contact organisations in various sectors are provided for prospective investors. A list of potential project areas are presented in the following sectors:

- Energy
- Transport
- Coal mining
- Industry
- Agriculture

A project pipeline has not been developed in any detail as a wide range of projects are being developed through a number of different initiatives and it was not considered useful to duplicate this work.
However three prospective projects have been evaluated in terms of a list of preliminary project criteria in order to illustrate the type of project that are being developed and their compliance with a preliminary list of criteria. These are:

- Natural gas pipeline
- Landfill gas
- Thermal efficient housing

**PLAN OF ACTION TO PURSUE PROJECT INVESTMENT**

The study has identified the steps to be taken to establish the CDM as a viable investment mechanism in South Africa. These steps include the following:

- Establishment of necessary institutional capacity in government and civil society and business organisations
- Incorporation of a CDM investment strategy into the overall investment strategy of the country
- Identification of synergies between potential CDM projects and other national initiatives towards sustainable development

In order to approach the implementation of these steps, the National Economic, Development and Labour Advisory Council (NEDLAC) has decided to undertake project funded by research funds made available through the Fund for Research into Development, Growth And Equity (FRIDGE). This study will be managed by a Project Steering Committee comprising representatives of business and labour and various departments.

Preparations are also well advanced for a Project Development Workshop, which is being co-hosted by the South African government and the World Business Council for Sustainable Development. The objective of this workshop is to use case studies of potential projects to develop the elements of the project development cycle. The National Strategy Study is being used as the basis of the workshop documentation.