Global Environment Facility

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April 30, 2007

Dear Council Member:

I am writing to notify you that UNDP, the Implementing Agency for the project entitled, ***South Africa: South Africa Wind Energy Programme (SAWEP), Phase I***, has submitted the proposed project document for CEO endorsement prior to final approval of the project in accordance with UNDP procedures.

Over the next four weeks, the Secretariat will be reviewing the project document to ascertain that it is consistent with the proposal included in the work program approved by the Council in November 2004, and with GEF policies and procedures. The Secretariat will also ascertain whether the proposed level of GEF financing is appropriate in light of the project's objectives.

If by May 28, 2007, I have not received requests from at least four Council Members to have the proposed project reviewed at a Council meeting because in the Member's view the project is not consistent with the Instrument or GEF policies and procedures, I will complete the Secretariat's assessment with a view to endorsing the proposed project document.

We have today posted the proposed project document on the GEF website at www.theGEF.org. If you do not have access to the Web, you may request the local field office of UNDP or the World Bank to download the document for you. Alternatively, you may request a copy of the document from the Secretariat. If you make such a request, please confirm for us your current mailing address.

Sincerely,

cc: Alternates, Implementing Agencies, STAP

REQUEST FOR CEO ENDORSEMENT

GEFSEC PROJECT ID: 1338
IA/ExA PROJECT ID: 1637
COUNTRY: South Africa
PROJECT TITLE: Technical Assistance to the South Africa Wind Energy Programme (SAWEP)
GEF IA/ExA: UNDP
OTHER PROJECT EXECUTING AGENCY (IES): Department of Minerals and Energy (DME)
DURATION: 2 years
GEF FOCAL AREA: Climate Change
GEF STRATEGIC OBJECTIVES: CC-2 (Increased access to local sources of financing) and CC-3 (Power sector policy frameworks)
GEF OPERATIONAL PROGRAM: OP 6
COUNCIL APPROVAL DATE: Nov 2004
COUNCIL APPROVED AMOUNT*: 2,000,000
CEO ENDORSEMENT AMOUNT*: 2,000,000
ESTIMATED STARTING DATE: 01 June 2007

FINANCING PLAN ($)			
		PDF	Project*
GEF	A		2,000,000
	B	295,000	
	C		
GEF Total		295,000	
Co-financing		(Provide details in Section d): Co-financing)	
GEF IA/ExA			
Nat. govt.		5,187	2,955,000
Others		180,000	7,384,000
Co-financing Total		185,187	10,339,000
Total		480,187	12,339,000
Financing for Associated Activities, if Any:			

* For multi-focal area projects, indicate agreed split between focal area allocations.

Approved on behalf of the *UNDP*. This proposal has been prepared in accordance with GEF policies and procedures and meets the standards of the GEF Project Review Criteria for CEO endorsement.

Frank Pinto
Executive Coordinator
UNDP/GEF
Date: 25 April 2007

Project Contact Person: Marcel Alers
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FINANCING

a) PROJECT COST

Project Components/Outcomes	Co-financing ($)	GEF ($)	Total ($)
1. Public sector incremental cost funding.	45,000	110,000	155,000
2. Green power funding	605,000	640,000	1,245,000
3. Long tern policy and implementation framework for wind energy.	45,000	100,000	145,000
4. Wind resource assessment	45,000	310,000	355,000
5. Commercial wind energy development	9,504,000	300,000	9,804,000
6. Capacity building and institutional strengthening	7,500	179,500	187,000
7. Monitoring, learning and evaluation	7,500	112,500	120,000
7. Project Management budget/cost*	80,000	248,000	328,000
Total Uses of Funds/project costs	**10,339,000**	**2,000,000**	**12,339,000**

* Breakdown of this aggregate amount is presented in the table b) below:

b) **PROJECT MANAGEMENT BUDGET/COST**[1]

Component	Estimated Staff weeks	GEF ($)	Other Sources ($)	Project Total ($)
Locally recruited personnel*	190	204,000		204,000
Internationally recruited consultants*				
Office facilities, equipment, vehicles and communications		19,000	30,000	49,000
Travel		20,000	30,000	50,000
Miscellaneous		5,000	20,000	25,000
Total		**248,000**	**80,000**	**328,000**

* Local and international consultants are hired for functions related to the management of project. Consultants, who are hired to do a special task under outcomes 1-6, are referred to as s providing technical assistance (details are provided in c) below. Travel for staff within South Africa only.

c) CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

Component	Estimated Staff Weeks	GEF ($)	Other Sources ($)	Project Total ($)
Personnel				
Local consultants*	376	543,000		543,000
International consultants*	150	461,500		461,500
Total	**526**	**1,004,500**		**1,440,000**

***** Excludes travel cost of consultants

[1] A description of in terms of their staff weeks, roles and functions in the project, and their position titles in the organization, such as project officer, supervisor, assistants or secretaries is given in Annex 6 of the Project Document.

d) CO-FINANCING

Name of Co-financiers (source)	Classification	Type	At Concept ($)	At Work Program ($)	At CEO Endorsement. ($)*
CEF	Nat'l govt.	In cash		2,400,000	2,655,000
Government	Nat'l govt.	In kind			300,000
Danida	Bilateral Ag.	In cash		2,300,000	2,609,000
DBSA	Dev Bank	In cash		2,600,000	3,495,000
City of Cape Town	Local Govt.	In cash		580,000	580,000
Darlipp-IPP	Private	In cash		500,000	700,000
Total Co-financing				**8,380,000**	**10,339,000**

Reflecting the final commitment amount of co-financiers as evidenced by the attached documents confirming co-financing commitments.

2. RESPONSE TO REVIEWS

a) GEF SECRETARIAT REVIEW AND UNDP RESPONSE AT CEO ENDORSEMENT (DECEMBER 2006)

GEFSEC Comment: 1) The section on the project's strategy makes it sound to some degree as if this project is a choice of the agency, and that there is little country drivenness. Please strengthen.

UNDP response: This project is a choice of the government. Since the Exec Summary and Project Document were first formulated, South African actors involved (in particular the Government) have not been standing still:

1. Cape Town. The PPA for the Darling Wind Farm has been signed for a period of 25 years and financial closure has been reached. CEF has already invested 2 million ZAR for the deposit of the turbines.
   - The PPA has been signed with condition that the guarantee scheme is developed as described in Annex 3 of Section IV of the SAWEP project document.
   - DBSA loan funding has been approved, knowing that the GEF guarantee scheme for Cape Town has been agreed. The guarantee scheme will cover some of their risks as the first phase has been in principle approved by GEF.

2. National government:
   - The government has commenced pre-feasibility study on TRECs, and is also busy preparing a feed-in position paper. During this initiative, private players have indicated their willingness to be part of national team to formalize TRECs in South Africa.
   - Electricity Regulation Act:
     The Act now enables the Minister to make decisions on market regulations with respect to the type of energy sources, percentages of those sources and whom to buy it from and sell it to, including the use of renewable energy. This is a breakthrough as it is the first time the Minister has the mandate to make things happen. The Act is further substantiated by the Energy Bill prepared for cabinet, confirming the Act and providing entry mechanisms for renewable energy and energy efficiency.

3. Wind interest has trickled down from national to provincial and local level:

- As a spin-off from the Darling and UNDP GEF SAWEP PDF B, the Provincial Authorities of the Western Cape have taken the initiative for a strategic environmental feasibility study to assist future potential developers in wind energy.
- National government has approved the EIA of the Darling Wind Farm (this is the first time in South Africa and a milestone for EIA evaluation with respect to Wind Energy). Based on this event, the Province of the Western Cape launched the initiative to assist private developers with EIA for Wind farms.
- A number of wind initiatives are being taken in the infant stage of development in the country. The South African government stresses the need for the SAWEP project as a key element to continue the momentum generated by SAWEP and to deliver on the project. For example, Enercon India has already started business near the Darling wind farm and also plans to set up office in Cape Town; Eskom is reported to have announced its first investigation on a wind farm; the National SA Energy Research Institute has a specific focus for the future on research and development in renewable and wind energy.

GEFSEC Comment: 2) Please demonstrate interest by City of Cape Town with commitment letter, and endorsement letter for the scheme as described in annex 3.

UNDP response: The PPA for the Darling Wind Farm has already been signed for period of 25 years (attached under Section V of the Project Document) between the City of Cape Town and Darlip. Also, a power wheeling agreement has been signed between Darling IPP and Eskom for supply power to Cape Town.

GEFSEC Comment: 3) The document contains an extensive discussion of the supply curve and the 10000 GWh commitment, which should be abbreviated. The main points seem to be:

- There is a commitment to 10 kGWh for now and more later
- There are a number of technologies with limited potentials, all of which need to be deployed to reach this and the long-term goals
- None of them will compete with coal on a cost basis beyond the 10 GWh, or be financially attractive at current retail prices, so if RSA wants to reach their long-term goal, sustainable political support and additional financing is necessary.

GEFSEC Feb '07: RESUBMISSION: description of activities on wind in RSA demonstrates country commitment to wind power

UNDP response: The text in the Project Document has been condensed and is now given in paragraph 1.1 (of Section I, Part I). The argument indeed is that the South Africa needs urgently to expand its power generation capacity. Traditionally being based on fossil fuels (coal), the Government has clearly stated to aim at 10,000 GWh power generation by renewables by the year 2013. Within the renewable energy 'family', landfill gas and biomass-based options (e.g. sugarcane) are cheaper option and might be preferred over more expensive wind to achieve the target. Having a longer-term perspective, a study shows that, of the renewable sources, wind actually has by far the largest potential in terms of availability of the resource (for power generation). Thus, when the 'low hanging fruits' (bagasse and landfill gas) have been exhausted in the short run, wind energy will start being phased in the medium term, say by around 2013. However, this cannot happen overnight as many barriers exist that hamper the utilization of wind energy (as explained in detail in the Project Document in paragraph 1.2.1 of Section I). By supporting capacity building and getting first experience with private-sector-led wind power development right now, will mean that an enabling environment would be in place when winds needs to be phased in the power generation mix after 2013. To help these efforts, UNDP GEF support has been requested.

In terms of costs of wind energy production, these are likely to come down over the next 5 years:

- The South African Government is already investigating financial options and tools that can be used for development of renewable (including wind energy), such as the studies feed-in tariffs and TRECs mentioned earlier.

- In corroboration to this, the DNA is established in the offices of the DME, up and running. The DNA is up and running and doesn't need to be further developed. It can be readily used whenever CDM projects are developed. The presence of the DNA within the DME facilitates coordination of the SAWEP projects and potential CDM development. Assuming a value of certified emission reductions (CERs) of € 10 per tCO_2, CERs can contribute up to ZAR 0.09 per kWh, thus having the potential to significantly reduce costs.

GEFSEC Feb '07, RESUBMISSION: discussion appropriately amended

GEFSEC Comment: 4) Signing of the PPA between Darlipp and CCT

UNDP response: The PPA was signed in 2006 and submitted together with the Project Document (see Section V).

PPA has been attached

GEFSEC Comment: 5) The conditions expected for CEO endorsement seems to be achieved. However, there are a number of points to be addressed:
1. Please clarify the scope and the outputs of the current proposal. The proposal asks for 2 mUSD ("phase1), but includes in its outputs (including logframe, CO2 analysis) the investments to be expected under "phase2"
2. Triggers for phase 2: Changes in the GEF programming system question the necessity for these triggers. It is recommended to reformulate them as conditions that would facilitate successful implementation of a project that seeks investment support for wind in RSA. The actual trigger would be an OFP request to the GEF. In that sense, government commitment to wind constitutes a necessary precondition for a larger-impact project
3. In that context it would also be advisable to re-title the project "technical assistance for wind power market development in RSA" or something along these lines - as to make it clear that this is not an unsustainable effort that relies on GEF funding for ever, but a planned market development activity that may or may not be followed by an investment phase.

"Phase 1" (this proposal) should be a closed set of activities that can create sustainably improved market conditions even if "phase 2" never happens.

UNDP response: The Project Document has now been revised assuming that SAWEP (Phase 1) will be a stand-alone activity that by itself lays the groundwork for future wind development. SAWEP has been restructured in such a way that it focuses on providing 'technical assistance' to the South African Government in terms of development of the most appropriate financial and policy instruments. The reasoning is that few commercial developers will be interested in wind development without an appropriate policy, institutional and regulatory framework for grid-connected wind energy. Lack of institutional capacity is causing serious delays and misdirection of projects where developers are forced to focus on these institutional barriers rather than on the project's financing and securing the necessary resources for the project's development.

In this sense, the project has been renamed 'Technical Assistance to the South African Wind Energy Programme (SAWEP)'. The project document now presents a stand-alone consistent set of outcomes, outputs ands activities (including budget, logframe and CO_2 analysis).

Phase 1 (that is, this proposal) will create a solid basis for the Government to take a decision on the longer-term support for renewable energy, including the policy and implementation strategies to be followed. Based on such a commitment, a second phase could be entered into that would focus more on promoting the investment in wind by supporting the implementation of the financial and policy measures designed in the 2-year SAWEP (first phase). One activity in SAWEP will therefore be the design of such a follow-up (second) phase that could be presented to the Government or donors (including UNDP/GEF).

We believe that two years may enough to lower some of the barriers, but a five-year programme is needed (as originally envisaged) to remove all of the interrelated financial and policy-institutional barriers.

In this respect, we would like to stress also that the guarantee scheme for Cape Town was designed as going across the 2 phases. Not getting the 1.4 million GEF (spread over the 2 phases) guarantee may adversely impact on Darling project and pose potential risk for failure.

GEFSEC Feb '07: Clarified to the effect that Phase 2 will be dealt with within the normal processes and procedures; Project Renamed

GEFSEC Comment: 6) The project intends to create a TRECS scheme. This was not expressly included in the project brief. It is probably a good idea, but might

1. Benefit from being expandable to other technologies, and
2. Overlap / conflict with a rise in CDM activities and carbon trade. Carbon finance should also be considered one replicability option, and this component needs to pay heed to both markets, the one for CERs as well as for RECs. Please clarify.

UNDP response: The Government has already done pre-feasibility study on the creation and of a TREC scheme in South Africa looking at all renewable energy sources. For this, it has learnt from best practices in the world, including Europe, US and Australia. The SAWEP project would be piloting the implementation of the TREC scheme specifically for Wind Energy. The experience from this initiative will again be used to grow the national experience on TRECs and their implementation, again broadening it to all renewable.
From a TRECs point of view there is no conflict with CDM funding in the same projects, or any other support finance as long as such support funding is reflects in the TREC certificate so as to allow market to respond to this issue in terms of market pricing mechanisms.

GEFSEC Feb '07: RECs should be included. Proponents are aware of pros and cons.

GEFSEC Comment: 7) Minor errors: Para 38: first bullet, kW instead of kV

UNDP response: corrected

GEFSEC Feb '07: Corrected

GEFSEC Comment: 8) CDM is dismissed as contributing too little for the sustainability of the investments, but assuming 10 Euros per ton, and 1 kg/kWh, CERs can contribute up to 9 Rand Cents per kWh. This seems significant in this context.

UNDP response: In the latest version of the Project Document, CDM is NOT dismissed. Being driven by private sector, CDM investment in renewables will focus on the 'low hanging fruits' first, especially CH_4 emission reduction projects (e.g. landfills) or larger biomass projects. In the medium run, CDM will become increasingly important for wind power developer as a cost reduction mechanism. In general, the use of other financing mechanisms (feed-in tariffs, etc.) will also become more integrated with CDM.

GEFSEC Feb '07: Done. CDM is a potential replication finance mechanism

GEFSEC Comment: 9) The project is designed with a strong focus on replicating the Darling investment.

UNDP response: Darling is a demonstration, learning-by-doing, activity, and as such is not to be replicated. The role of Darling is that important lessons can be learned that will assist the bigger SAWEP program and ultimately the development of national commercial projects

GEFSEC Feb '07: No, proponents think replication will be cheaper and less involved

GEFSEC Comment: 10) M&E Please reformulate targets such that phases 1 and 2 are clearly distinguished.

UNDP response: See Part IV of Section I as well as the logical framework analysis of Section II which has been adjusted.

GEFSEC Feb '07: Done

GEFSEC Comment: 11) No commitment letters from CCT, DBSA, DANIDA?

UNDP response: All letters are available and attached.

- DBSA funding has been approved and loan agreement signed
- CCT: the PPA has been approved and PPA agreement signed for a period of 20 years
- DANIDA funding has been paid to the SA government, 90% paid and 10% agreed to pay upon completion of the guarantee contract period.

GEFSEC Feb '07: Letter from Danida submitted. PPA confirms CCT's commitment. Letter from DBSA only indicates that they know about the project and want to implement it and does not explicitly contain financial commitment.

UNDP response Feb. '07: The co-financing letter of DBSA has now been attached. The co-financing is actually higher than the amount indicated in the Project Document, namely ZAR 25,512,000 (= USD 3.56 million) at mid-Feb.'s UN exchange rate. This latest version of the Project Document has been adapted in such a way that it reflects the right figures (note: these latest changes are highlighted in pink).

GEFSEC Comment: 12) US Council comments should receive better response. They actually question the rationale for wind in South Africa in general. The response should go into that, quoting the immediate commitment to 10,000 GWh, and the long-term commitment to wind, as well as the interest in replication through the CDM.

UNDP response: The UNDP response to the US comments has been amended as follows: The Government has clearly stated to aim at 10,000 GWh power generation by renewables by the year 2013. Within the renewable energy 'family', landfill gas and biomass-based options (e.g. sugarcane) are cheaper option and might be preferred over more expensive wind to achieve the target. Having a longer-term perspective, a study shows that, of the renewable sources, wind actually has by far the largest potential in terms of availability of the resource (for power generation); paragraph 1.1.2 of Section I mentions a 74% contribution of wind in the renewables potential of 86,000 GWh (see figure 2)! In other words, when the 'low hanging fruits' (bagasse and landfill gas) have been exhausted in the short run, wind energy will start being phased in the medium term, say by around 2013. However, this cannot happen overnight as many barriers exist that hamper the utilization of wind energy (as explained in detail in the Project Document in paragraph 1.2.1 of Section I). By supporting capacity building and getting first experience with private-sector-led wind power development right now, will mean that an enabling environment would be in place when winds needs to be phased in the power generation mix after 2013. To help these efforts, UNDP GEF support has been requested.

GEFSEC Feb. '07: OK

GEFSEC Comment: 13) General Comments:
Can you please submit to the secretariat the reports described in Annex 5?

UNDP response: OK

GEFSEC Feb. '07: Please do

GEFSEC Comment: 14) The project cannot be recommended for CEO endorsement as
1. Co-financing commitment letters are missing.
2. During project preparation, GEF policies and procedures have changed and will continue to change over the next year, affecting the "phased" approach. The project needs to pay heed to these new realities and potentially revisit some of the components. At any rate, the presentation needs to be adjusted to the new process. This affects the comments under "project design", "sustainability", "M&E"

For a resubmission, we also recommend to revisit the response to Council comments, and the document overall (see comments above under "eligibility", "country drivenness"). These would be helpful improvements, but will not at this point be raised as obstacles for CEO Endorsement.

UNDP response: The co-financing letters are still valid and will be re-submitted. The SAWEP proposal has been revised and restructured taking into account the observations of the GEF Secretariat regarding the changing GEF policies and procedures as well as revisiting the Council comments.

GEFSEC Feb. '07: Most points are addressed. Further discussion per e-mail

Discussion per e-mail (response sent to GEFSEC on 20.03.2007, see UNDP response (in italics below):

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Finally I have had a chance to look at this project for CEO Endorsement. The following questions are still open:

1. I seem to have tomatoes on my eyes, but I still can't find the commitment letter from DBSA. I do find a letter in which they commit to implementing this project, but the executing agency is actually DME, no? Please clarify.

The co-financing letter of DBSA has now been attached. The co-financing is actually higher than the amount indicated in the Project Document, namely ZAR 25,512,000 (= USD 3.56 million) at mid-Febr's UN exchange rate. This latest version of the Project Document has been adapted in such a way that it reflects the right figures (note: these latest changes are highlighted in pink).

2. The PDF completion report is dated some time in 2007. However, it still gives estimated number for the estimated financial closure which was supposed to happen in 2004 or so. Please clarify. I will have to include in the letter that you are getting from us the USD amount that you will have to give back to the trust fund.

The table does not give the correct figures. UNDP CO South Africa has provided us with the right figures (changes in the PDF Implementation Report are highlighted in yellow).

3. Please find atached the form that I have to fill out for the financial arrangements, which is a comparison between WP inclusion and CEO endorsement. I have the following questions:
- why did the project objective change between wp inclusion and ceo endorsement? and how can I sell this in this sheet?

There is an inconsistency in definition in objectives and goals in the document submitted for WP inclusion, between what is mentioned in section 2.2 (on page 43), namely 'global environment objective', 'strategic goal' and 'national development objective' and between what is mentioned in the logframe (on page 65), namely 'goal' and 'objective'. Over the years of preparing the ProDoc these terminologies have changed and unfortunately these changes were not consistently put in throughout the WP inclusion ProDoc.

Please take what is mentioned in the logframe as the 'project objectives' both in the versions for WP inclusion and CEO endorsement.
WP inclusion: "To install and operate up to 50.2 MW wind power by the private sector by 2013"
CEO endorsement: "To install and operate up to 5.2 MW darling wind farm and prepare the development of 45 MW combined wind farms (by the private sector)"

The objectives differ bcause the project objective in the WP inclusion version covered both phases 1 and the possible phase 2, while the project objective in the CEO endorsement version does not cover a follow-up phase 2 (as suggested in the Concept Agreement Review sheet)

- cofinancing: your table on cofinancing gives the same amount for WP and CEO E. When I tried to reconstruct the WP table from the actual WP document, I got the numbers that I have filled in here. Where did I go wrong? I tried to only count the cash cofinancing - maybe some of the in-kind is missing?

(1) With the co-financing of DBSA now clearly defined, the cofinancing for WP and CEO E are not the same anymore. We've adapted and checked the figures in the ProDoc accordingly as well as in the 'Financial Comparison between WP I and CEO E' sheet (again: latest changes are highlighted in pink colour).
(2) Co-financing letters of CEF and DBSA are given in ZAR. For consistency's sake, we have converted these amounts at the 15 Febr UN exchange rate of USD = ZAR 7.3. Please note also that co-financing is the same in ZAR, but is higher in US$ terms in comparison with a few years ago.

- why are there shifts in the financing of components between WP inclusion and CEOE?

Two reasons:
(a) until recently it was not custom always to seperate the 'project management (PM) cost', instead in older documents (and budgets) these cost were divided over the budget of the individual outcomes or put as part of one outcome. This latest version details the PM cost separately from the budget for outcomes (following the format of the tables in the CEO endorsement sheet). Please note that the WP inclusion version of the ProDoc does not really give a PM cost indication;
(b) When revising the list of outputs and activities (to be sure these referred to phase 1 activities only) the budget was slightly adapted accordingly.

4. Stupid question from my side: The project has a subsidy / investment component - component 2, green power funding, 640 k. Shouldn't all the rest of the funds go either to TA or to program management? The two tables on that only sum up to 1380 k. What are the other 150 k used for? In-kind stuff? How can I close the gap in the table?

This has been revised now also, GEF contribution is USS 640,000, of which an estimated contribution to the guarantee scheme of US$ 560,000 . See revised tables in the project document.

UNDP GENERAL COMMENT:

Please note that an outcome 7 (monitoring, learning & evaluation) has been added and that the cost of project management has been separated from the cost estimates of the outcomes.

b) COUNCIL

WORK PROGRAM: COMMENTS FROM COUNCIL MEMBERS (REFERENCE TO GEF/C.24/5 – October 19, 2004

1. South Africa: South Africa Wind Energy Programme (SAWEP) (UNDP)

Comments from U.S.A.

Summary: South Africa has good potential for the cost-effective operation of wind farms. Market surveys have also shown that there is significant willingness among progressive, primarily industrial customers to pay a premium for environment-friendly electricity. This project will pilot a green power tariff for wind energy in the city of Cape Town, South Africa. In the first phase, GEF support will enable the city government to enter into a 20-year power purchase agreement with the municipal distribution company to provide wind-generated electricity to Cape Town customers.

To build the market for wind power, the GEF will provide an incentive for marketing the power as well as risk sharing for possible losses over the first 5 years. The GEF contribution is $2 million in the first phase of the project, for which Council approval is sought now. The government and the private sector will provide $8.4 million in co-financing for this first phase.

The South African government has committed to a 10,000 GWh target for the annual contribution of renewables to energy use in the country over the long term. An implementation plan to achieve this target will also be developed as part of the project's outcomes. On the basis of this plan, as well as the experiences from the first phase, a second phase of the project will come back for Work Program inclusion, with higher long-term ambitions for the expansion of wind power. The proposed second phase of the project will expand the green power scheme to other municipalities and regions in South Africa, but will also provide support to the government of South Africa to implement these more ambitious plans GEF has pipelined $5 million and the government and private sector are expected to contribute another $55 million in co-financing for this second phase.

Objective: The project's objective is to diversify power generation in South Africa's energy mix; to set up a wind energy industry that could generate employment and could export to the SADC region; and to promote sustainable development by making use of the nation's renewable, natural resources (such as wind).

U. S. Position: The proposal seems scientifically feasible and in theory has developed a clear strategy for introducing and establishing wind energy production in SA. However, we question the likelihood of success given: (a) the high cost (2:1) of wind energy compared to traditional coal energy; (b) the increased production of other renewable energy such as hydro-power from places like Mozambique; (c) the need for consumers to pay more for green power; and (d) inadequate demonstration of the government's ability to create the enabling environment to address these issues. Therefore, the US request that this proposal be re-circulated to the Council prior to CEO endorsement with greater emphasis in the text on these issues, and stronger elements in the logical framework on the policy environment.

UNDP response:

(a) High cost of wind power: The cost of wind-generated electricity compared to coal based power is indeed high. The relative low cost of electricity is partly due to subsidies over the past decades towards coal-fired power plants. The new generation of coal based power plants will not benefit from those subsidies; hence the generation cost per KWh will increase substantially, which will help to close the gap with wind generated electricity. In order to close the remaining financing gap this project is introducing innovative financing schemes and at the same time is working with the South African government on

creating a conducive policy environment. The introduction of a feed-in tariff is currently under discussion and this project will help in furthering those plans.

Furthermore, the issue of relatively high cost compared to coal energy is analogue to the situation in other countries with successfully developing wind energy markets. A combination of market incentives through financing schemes and adequate policy instruments can assist in bridging the financing gap as experienced in other countries. This is why the South African Government and UNDP believe this project is timely and necessary.

In addition, it needs to be recognized that SAWEP is part of a medium term phasing-in process into the SA energy mix. The potential of wind energy as RE Technology is substantial and represents 74% of the total RE Technology potential in SA.. To address the energy cost implication (low generation cost from coal vis a vis high cost of energy generation from RE Technologies) the SA Government has adopted a phasing-in process of RE Technologies based on a least cost option. This means that the bulk of wind energy will be phased-in from 2013 and onwards. To allow wind energy to play its meaningful role as the main RE Technology for the future in SA the introduction of wind energy as a major player in this field should start now. The SAWEP has therefore adopted a realistic approach of sponsoring a 50MW target.

(b) Other renewable energy sources: Economic Modelling Studies show that wind energy is the key technology to be promoted in the long run. The result of a renewable energy supply curve study prepared for DME (Economic and Financial Calculations and Modeling for the Renewable Energy Strategy Formulation), estimates the least-cost supply curve for the 10,000 GWh target. It draws up individual supply curves for the most promising Renewable Energy Technologies (RETs) and combines these into the overall least-cost RE supply curve for South Africa. According to the study, up to seventy four (74) percent of the technically realistic RET-potential could come from wind energy, which makes it one of the key RET to promote for a significant penetration of RETs on the power market. All other RE carriers, including micro-hydro, have much lower market penetration percentages. Please compare paragraphs 16-35 in this project document for a more detailed discussion of the role of wind energy vis a vis other renewables.

The Supply Curve Study further shows that 0.6% of the renewable energy mix will come from wind power; i.e. 63 GWh and this is based on IEC (International Electro-technical Commission) wind class 1 sites only (i.e. estimated annual wind speeds in excess of 8.5 m/s at hub heights of 60 meters) with potential capacity factors ranging from 37-49%.

The approach adopted is a gradual phasing in of wind energy up to about 45 MW over the period 2005-2013; i.e. up to total installed capacity of 45 MW will be up and running in 2013. This will create a solid basis for further expansion of wind energy after 2013, mainly because of the critical wind farm capacity (45 MW) established for considering investments in local manufacturing and moreover it will make it possible to spread the development of wind energy over a number of sites across the country, thereby creating multiple 'breading grounds' for wind energy expansion.

(c) Voluntary Premiums: The City of Cape Town is introducing with support from this project a voluntary premium scheme. Such a scheme could be replicated in other major cities but clearly there is a limit for the voluntary premium market. Other financing schemes and policy instruments need to be introduced to complement the voluntary scheme and roll out wind at grand scale. The role of the voluntary scheme at this early stage is to show what can be done in terms of finding creative solutions to reduce the cost barrier under adverse market conditions.

Currently the green power market is being estimated at 309 GWh/annum, which corresponds to a generation capacity of 123 MW. Extensive activities with regard to green power market surveys and a green power guarantee scheme have been designed to properly address this risk. For Cape Town alone the green power market is estimated at 50.6 GWh (20 MW) with a market penetration level of 0.5%. The

market penetration level is calculated at a conservative 0.5%. International experience over approximately a decade has shown that the voluntary markets for Green Power achieve up to 1% penetration of the overall electricity market without specific incentives.

(d) Enabling Environment: The government of South Africa is fully committed to achieve the target of 10,000 GWh of Renewables by 2013. Furthermore, there are advanced discussions about the introduction of a feed-in tariff and other energy policy instruments. This project is instrumental in creating an enabling environment for wind energy and renewables. Section 1.1.1 has been updated to reflect the government's commitment to create a conducive policy environment.

(e) Long-term potential of wind: South Africa needs urgently to expand its power generation capacity. Traditionally being based on fossil fuels (coal), the Government has clearly stated to aim at 10,000 GWh power generation by renewables by the year 2013. Within the renewable energy 'family', landfill gas and biomass-based options (e.g. sugarcane) are cheaper option and might be preferred over more expensive wind to achieve the target. Having a longer-term perspective, a study shows that, of the renewable resources of around 86,000 GWh in the longer run,, wind actually has by far the largest potential in terms of availability of the resource (for power generation), around 74%. . Thus, when the 'low hanging fruits' (bagasse and landfill gas) have been exhausted in the short run, wind energy will start being phased in the medium term, say by around 2013. However, this cannot happen overnight as many barriers exist that hamper the utilization of wind energy. By supporting capacity building and getting first experience with private-sector-led wind power development right now, will mean that an enabling environment would be in place when winds needs to be phased in the power generation mix after 2013. To help these efforts, UNDP GEF support has been requested.

Elements of the LogFrame that relate to the policy environment:

Component 1 and 3 both at the level of outcomes, outputs and indicators relate to the policy environment as follows:

Component 1:
Outcome 1: To assist the Government of South Africa with detailing the most appropriate financial instruments that should be made available to stimulate commercial wind energy developments.
Indicator: Financial instruments for long-term wind energy development (e.g. feed-in-tariff) available by end of phase 1
Output: Detailed financial instruments to stimulate commercial wind energy developments have been designed and accepted for implementation by the Government
Indicator: Appropriate financial instruments available for continued wind energy developments at the end of year 5 of the project

Component 3:
Outcome 3: To assist the Government of South Africa with the development of a long-term policy, including implementation strategy, for wind energy development.
Indicator: Implementation strategy (including allocation of funding) of the White Paper on renewables in which wind energy is appropriately integrated in place by end of phase 1
Output: A long-term policy for wind energy, including an implementation strategy and policy (financial) instruments has been designed and accepted by the Government for inclusion into their overall renewable energy policy and implementation strategy
Indicator: Implementation strategy (including allocation of funding) of the White Paper on renewables in which wind energy is appropriately integrated exists before the end of the second year of the project

Comments from Germany

General Comments: The project proposal addresses an important topic: The increase of the use of renewable energies, especially wind energy for electricity production in South Africa. The project's objectives are welcome and may have an important environmental benefit. However, some remarks to the activities are made:

1) The project identifies the financial barrier as foremost barrier against the use of a further wind energy development. Therefore, the first phase will focus on technical assistance to the South African Government in terms of policy making and the development of the most appropriate financial instrument for policy implementation. One of the major reasons for some current wind energy projects in South Africa being on hold, are missing power purchase agreements between ESCOM as South Africa's dominant electricity utility (and network operator) and project developers. As network operator ESCOM plays an important role in the further development of the utilisation of wind energy in South Africa. Therefore, it might be suitable to include ESCOM in the range of activities, e.g., in activity # vi: Capacity building and institutional strengthening.

2) Financial sustainability is supposed to be enhanced by a longer-term wind energy policy and the setting-up of a long-term, well-structured green power market with reliable instruments such as green Power Purchase Agreements and Tradable Renewable Energy Certificates. It is assessed that the overall market for Green Power over the next decade has the potential to grow substantially. Given international experiences with green power marketing, the success of voluntary programmes for buying green power is rather limited. Even with huge financial marketing support, the voluntary uptake of green power by customers on a voluntary basis is not sufficient to create a sustainable market for wind power and green power in general. Given the actual and expected electricity market development in South Africa, these experiences can be transferred to South Africa. Therefore, the focus of the project on developing a green power market should be enlarged and further instruments to support the development of wind power in South Africa should explicitly be mentioned (e.g. an initial system of feed-in-tariffs).

Changes: These changes comprise the integration of ESCOM as major player on the South African power market into the project's activities and the enlargement of the proposed energy policy instruments from a voluntary green power scheme to internationally well-established, successful energy policy instruments.

Recommendation: Taking into account above comments, Germany supports the proposal. Changes should be made during further planning steps and project implementation.

UNDP Response:

ESKOM: ESKOM will indeed be an important stakeholder throughout the project and will be represented in the Technical Advisory Committee. Furthermore, Outputs 6.1 and 6.2 now include ESKOM as a stakeholder and beneficiary.

Voluntary Market: We agree with the German council comment on the limitations of an instrument such as the voluntary premium scheme. The uptake of green power by customers on a voluntary basis is indeed not sufficient to create a sustainable market for wind power and green power in general. As described in the ProDoc the City of Cape Town is introducing with support from this project a voluntary premium scheme. Such a scheme could be replicated in other major cities but clearly there is a limit for the voluntary premium market. Other financing schemes and policy instruments need to be introduced to complement the voluntary scheme and roll out wind energy at grand scale. The role of the voluntary scheme at this early stage is to show what can be done in terms of finding creative solutions to reduce the cost barrier under adverse market conditions. For longer-term solutions this project is working with the government to introduce a feed-in tariff and explore other energy policy instruments. Component 3 is designed to achieve this objective and in the LogFrame under component 1 the feed-in tariff is mentioned.

The national market for electricity and the green power market projections are presented in the ProDoc. Currently the green power market is being estimated at 309 GWh/annum, which corresponds to a generation capacity of 123 MW. Extensive activities with regard to green power market surveys and a green power guarantee scheme have been designed to properly address this risk. For Cape Town alone the green power market is estimated at 50.6 GWh (20 MW) with a market penetration level of 0.5%. The market penetration level is calculated at a conservative 0.5%. International experience over approximately a decade has shown that the voluntary markets for Green Power achieve up to 1% penetration of the overall electricity market without specific incentives.

The voluntary green power market is seen as a starting point in supporting RE Technologies in South Africa. The results of the market research support this view. However, it is understood that a substantial RE contribution to the energy mix cannot be based on voluntary green premium schemes alone. Therefore SAWEP makes provision for the development of Government supported financial instruments, which could include a feed-in tariff (see Activities –Phase 1 Component 1, par 103) or others.

Comments from France

The project aims at developing in 2 stages the wind energy sector in South Africa with a global objective of 50 MW over the 5 years period of the project. Some potential has been already identified for 123 MW. The field of Darling near Cape Town is ready for investment (5 MW). Generally speaking, wind energy is hampered by the abundant and very competitive coal energy and no real experience in RSA to develop "green power", long term policy for wind energy, training of decision-makers at national and regional levels. The first phase is made, therefore, of technical assistance mainly. DBSA is supposed to play a key role as the executing agency. The overall project cost is 71,61 M$. The first phase is estimated at 10,86 M$ (including the 5 MW investment of Darling field in phase 1), the second at 60,75 M$ (including the 45 MW to be invested in phase 2). The start of the second phase is subordinated of results of the first phase and clear commitments for financing the second phase. The GEF contribution is 2 M$ for the first phase and 5 M$ for the second phase. This comes in addition to a PDF-B of 295 000$. GEF contribution will represent 7,29 M$ in total (10%).

Opinion: The project is a typical UNDP project in the field of wind energy. The first phase is mainly public money (GEF = 2,295 M$ + DBSA 2,6 M$ + Danida 2,3 M$ + GoSA 2,0 M$). The private sector contribution is limited to 500 000 $. The participants of the second phase are unknown. The overall project is not sufficiently outlaid and explained, even though the two phases approach should mitigate the risk of no down-stream investments. A favorable opinion is given on the project due to the fact that the identification of sites and of investors for phase 2 is a clear objective of the phase 1 and will be a pre-condition to phase 2.

UNDP Response:

As correctly mentioned identification of sites and investors is a precondition for phase 2.

c) GEF SECRETARIAT

The GEFSEC Review Sheet from 24 September 2004 identifies the following condition at CEO endorsement stage:

- Signing of the PPA between Darlipp and CCT

UNDP Response:

The PPA between Darlipp and CCT was signed on 4 August 2006. Financial closure on the Darling wind farm was reached between all parties concerned in November 2006. The turbines have been ordered from Fuhrlaender in November 2006 and a deposit of 2million ZAR has been paid.

d) REVIEW BY EXPERT FROM STAP ROSTER (IF REQUIRED)

Herman Snel
July 2 2004

1. Introduction and framework

The present document contains the review of the UNDP/GEF project proposal entitled 'South Africa Wind Energy Programme (SAWEP). The proposed project aims at initiating the implementation of grid connected wind energy electricity generation in South Africa through a number of actions designed to eliminate identified barriers. The most important barrier mentioned is the extremely low present cost of energy for the South African generation capacity based on coal-fired plants. Special financial and policy support is therefore essential to reach the goal. However, other important barriers exist and must be removed, before substantial implementation of wind energy can become reality. One of the most visible deliverables of the project will be an installed wind electricity generating capacity of approximately 50 MW.

The total proposed project duration is of 5 years, divided into two phases. Phase 1 is to lay the groundwork for the real implementation, but includes the construction of a 5.2 MW wind farm, the design of which seems to be already very advanced. The remaining 45 MW of installed power is to be realized in the second phase.

The project description to be reviewed was received in the form of three documents [1,2,3] in electronic form, together constituting the complete Project Brief. The main document [1] and [3] is clearly written and organized in 7 chapters and a number of annexes. Paragraphs are consecutively numbered and the present review will make reference to this numbering. Numbers in round brackets refer to paragraph numbers, while numbers in square brackets point to references at the end of this review. The executive summary [3] also consists of numbered paragraphs. Reference to these will be by the paragraph number preceded by es: (esxx)

The project proposal is based on results of a PDF-B activity, executed in 2003-2004. Although much of the proposal will reflect these results, it would be helpful for the reader to include a summary of the main findings of that preliminary activity in an annex to the proposal. The reviewer did receive the PDF-B proposals documents

The reviewer is correct in stating that the Project Brief is based on the results achieved through a number of activities undertaken as part of the PDF-B in 2003-2004. A series of reports is available in which the outcomes of the PDF-B activities are presented. Instead of summarising these reports and adding these summaries to the Project Brief, the full final reports can be provided to the interested reader upon request. The reports prepared during the PDF-B are listed in Annex 5 and are available upon request (please contact the Department of Minerals and Energy – Mr. Andre Otto – andre.otto@dme.gov.za and Mr. Silas Mulaudzi – silas.mulaudzi@dme.gov.za):

- *Financial model to calculate wind energy costs, benefits and subsequent investment requirements – author: Hugh Ashby;*
- *Green power market survey for the City of Johannesburg – author: MSSA;*

- *Green power market surveys for the City of Cape Town – authors: MSSA and Anders Nielsen;*
- *Detailed proposal for wind resource assessments –author: CSIR;*
- *Economic and financial calculations and modelling for renewable energy strategy formulation ('renewable energy supply curve') – authors: Conningarth Economists;*
- *Green funding mechanisms – author: AGAMA Energy;*
- *Assessment of financial barriers and barrier removal activities – author: Sven Kreher;*
- *A practical barrier assessment and barrier removal activities for wind power development in South Africa – author: NuPlanet; and*
- *Financing of wind farms in South Africa – author: Wolfgang Mostert Associates.*

The project is divided into six components (see Chapter A), which are listed here for further reference:

- Public Sector incremental cost financing
- Green Power funding
- Long-term policy and implementation framework for wind energy
- Wind resource assessment
- Commercial wind energy development
- Capacity building and institutional strengthening

2. Scientific and Technical Soundness of the Project

The project is scientifically and technically well prepared, but a number of suggestions for improvements are possible. These will be discussed by paragraph of the project document. Specific suggestions can be found ordered alphabetically: a), b), etc.

Chapter B of the project document: 'Project Description', sketches the present electrical energy situation and policies of South Africa and the way in which wind energy could fit into it. It also proposes alternatives to the present policies. These form the core of the project proposal. The description is clear and concise. Nevertheless, it could benefit from the removal of a few inconsistencies and the addition of some clarifying observations.

a) Two Governmental White Papers on Energy Policy are referred to: the first of December 1998 (2) on general policy and the second of November 2003 (3), very recent, on Renewable Energy specifically. This second White Paper proposes 10,000 GWh of renewable energy production by the year 2013, of which 23% in solar thermal water heating (3), the remaining part is direct electricity production.

The relation of this value to the total energy consumption should be stated to obtain a feeling for the importance of this proposal. From other paragraphs a relation between this number and the 2001 consumption level can be inferred, but it would be much better to relate the number to the expected 2013 consumption level. An estimate will be done in the following lines.

Paragraph (18) states that the technical potential of renewable energy in SA is estimated at 87,000 GWh, equivalent to 49% of the 2001 consumption level, which then should be approximately 177,000 GWh. The amount of 10,000 GWh represents a 5.6% of the 2001 consumption. Furthermore, from figure 1, an expected increase of peak consumption of 3%/year can be deduced. If this increase holds true for the total consumption also, then the 2013 consumption level is 1,0312 = 1.43 times higher than the 2001 level, or approximately 250,000 GWh. This would signify a renewable energy contribution to electricity consumption of approximately 4% in 2013. This could be consistent with the 4% of installed power in RET, mentioned in (22), apart from capacity factor issues. The total grid capacity factor is estimated at 60%, as can also be inferred from (18)

The reviewer is correct in stating that it would improve the understanding of the importance of renewable energy production levels if it were to be linked to overall electricity consumption levels in 2013. His calculation provided above results in the 4% level which is also being used by the Department of

Minerals and Energy in their official publications. Paragraph 3 of the Project Brief has been updated stating this 4% level.

Tables 1 (18) and 2 (22) showing the technical potential of different Renewable Energy Technologies (RET) and their contribution to the 10,000 GWh goal respectively, are very interesting but could be analysed somewhat more.

b) In the first place, table 1 shows a very high wind energy potential of 64,000 GWh. At a capacity factor of 25% this would signify an installed wind capacity of 30 GW, at a capacity factor of 30% the necessary installed capacity would be of 25 GW. It would signify almost a doubling of the present generating capacity (36 MW). Notice that the present installed wind power in Germany (the highest in the world) is of 15 GW, in a total of 120 GW electrical capacity.

It would be interesting to know what is the basis of the estimated potential for South Africa. Oftentimes such potential estimates are based on rough wind climate estimates and do not take into account the usability of terrain, ground cover, accessibility, proximity to the grid, etc. Possibly the estimate is based on the Wind Atlas alluded to in (68). It can be inferred from that same paragraph that this atlas is partly (or entirely) based on measurements at existing weather stations. Usually weather stations are not situated in sites with the best wind potential, e.g. airports are preferably located at sites with low wind speeds. It is strongly suggested that one of the project outputs explicitly be an updated wind energy potential estimate in South Africa, including factors that measure the usability of land, and other factors mentioned above. Best possible way is to link estimated wind energy production cost to regions. This should among others based on the wind speed measurements proposed for both phases, but also on factors as accessibility, distance from the grid etc. It cannot be stressed enough that this information is essential for developers, but also for policy makers.

The reviewer is correct in stating that the wind energy potential estimates included in the Project Brief are very high, which is certainly partially a result of inaccurate information gathered from weather data collected from airports. Also no corrections have been made for accessibility and usability of terrain, the proximity to load centres and/or grid-connection, etc. The suggestion made by the reviewer to include as one of the project outputs an updated wind energy potential is fully appreciated. This has been included as one of the outputs of component 4 in the Project Brief. The Gov. has already initiated a project which is a pre-feasibility study to identify preferred measurement sites hopefully to be measured during Phase 1 of the SAWEP. In updating the Wind Atlas al of the above relevant factures will be considered.

Please note however that reference made to Germany (and Spain) is in terms of technical potential difficult to justify given the much larger coastal areas of South Africa, where wind regimes are anticipated to be in the same range as Germany.

c) Secondly, in table 2 the wind energy financial cost is estimated at 0.38 ZAR/kWh. At an exchange rate of 6.6 ZAR to the US $ this translates to 0.058$/kWh. This is indeed relatively low, as suggested in the document (48), but not unattainable for IEC wind class 1 sites! However the (exploitable) existence of IEC wind class 1 sites is apparently doubted in the document, see (68) and (48). Together with the observation b) one can conclude that the demonstration of a reasonable to good wind climate in a number of sites, should be a result of the first phase, and one of the conditions to enter into the second phase. For definition of what is a reasonable to good wind climate, one can make use of the definitions usually employed by NREL, i.e. an power density above 300 W/m2 is ‘good’, above 400 W/m2 is ‘excellent’, see e.g. [4]. For a Weibull shape factor of 2, this corresponds to annual average wind speeds of 6.4 and 7.0 m/s respectively. Alternatively, the IEC wind classes [5] can be used with class 3 as ‘good’ and classes 2, 1 or above as ‘excellent’, corresponding to 6.0 m/s and 7.5 m/s (at hub height) respectively. It is pointed out that a considerable part of Germany’s wind power is installed at IEC class 3 sites, and that special turbines have been developed for such sites, with a specific power of approximately 350 W/m2.

The suggestion made by the reviewer to make the availability of reasonable to good wind climates in a number of sites a condition to enter into phase 2 has been added to paragraph 86 where the milestones have been presented that will have to be met in order to enter phase 2 of the programme. For clarity the reviewer's definition of good wind climates has been included as a footnote in that same paragraph to avoid confusion.

d) Thirdly, as pointed out in (34) a.o., the employment of RETs as proposed for the 10,000 GWh in table 2, exhausts the potential for Bagasse, Landfill Gass and low cost hydro, indicated in table 1, while using near to nothing of the identified wind energy potential (1‰). Hence if there is a commitment for increased renewable energy employment beyond the 10,000 GWh goal, wind must be the technology of choice. However, in that light the stated goal (in annex 1) of 200 MW of installed wind power by 2020 is very low, it would merely add some 350 GWh annually to the 10,000 GWh planned. Also, it would not be sufficient at a mere 20 MW/year, to develop a mature wind energy industry in South Africa. It seems to this reviewer that something like a hope for commitment for at least 10 times this goal (hence 2000 MW) is needed to make the present project worthwhile.

The point made by the STAP reviewer is noted and considered valid. However, at the current status of renewable energy development in general in South Africa – and wind energy in specific – it would be unrealistic to already at this stage commit to a target of 2000 MW installed wind power capacity by the year 2020. South Africa's focus is to firstly successfully implement its renewable energy target of 10,000 GWh by the year 2013. Given the fact that this is the first major step in South Africa as renewable energy development is concerned (leaving aside the Government and donor-supported demonstration and pilot projects of the nineties and early 2000), it would be necessary to show positive results in terms of (rural) economic development, employment and environmental improvements prior to planning for longer term and more ambitious renewable energy developments. This will then provide the much needed public (and financial) support for continuation of (expensive) renewable energy developments, including wind energy. Therefore, the Project Brief focuses on successful application of a first small wind farm (Darling, 5.2 MW) followed by an almost tenfold expansion of that (45 MW) within a relatively short time frame of a 5-year project. This should then provide the basis for further developments, which have been conservatively estimated at a total installed capacity of at least 200 MW by the year 2020. However, the technical potential for installed wind power by the year 2020 is a multi-fold of this 200 MW and it is anticipated that with a successful implementation of the proposed initiative there will be a solid basis to enter into the discussion with the Government of South Africa about the longer-term perspectives of wind energy development, taking into consideration important aspects such as job creation; development of an industry with export potential into the SADC region and possibly beyond, thereby earning foreign currencies; diversification of the energy mix and increased self-reliance on electricity supply; and the need for Green House Gas (GHG) emission reductions that South Africa might have to consider within the next decade as a result of international treaties and obligations on GHG mitigation.

e) In (33) it is stated that for lower wind speed sites, 45 MW of installed capacity will be needed to generate the 63 GWh of annual energy. However this would signify a capacity factor of about 16%. This should be considered as too low for economic feasibility. In other parts of the document, a likely capacity factor of 27% is used for this installed capacity. This is a much more probable number for IEC wind class 2 sites. This should be made consistent in the document. In fact the real reason to propose the 45 MW is that it might be sufficient to create a basis for local assembly or even manufacturing, also mentioned in (33). This reason should not be confused with the need to generate 63 GWh! In fact at 27% capacity factor, the 45 MW installed power would generate 106 GWh annually. The 27% capacity factor is also used in Annex 3: Baseline and Emission calculation.

The Project Brief has been updated to make consistent use of a Capacity Factor of 27% in combination with 45 MW installed capacity, a figure resulting from the need to consider local assembly and possibly even local manufacturing of parts.

f) To develop wind energy at that scale, in competition with the extremely low present energy cost of 0.1 ZAR/kWh for coal fired plants (see (27)), needs a firm political commitment. Such commitment should start to become apparent with the national co-financing of the present proposed project. At the same time the present cost of production is so extremely low (equivalent of 0.015 US $/kWh) that it is not likely to prevail. The estimation of a LRMC of 0.25 ZAR/kWh (financial cost) seems much more reasonable. The fear expressed in (27) that actual costs will remain below this level for some time to come may be correct (that is the difference between present and long run, I assume). However an official commitment may be reflected in the willingness to pay (at least) the LRMC for present day wind energy projects. Something to this effect seems to be the case in the PPA between the Darling Developers and the City of Cape Town (35).

The reviewer correctly indicates that a firm political commitment from Central Government is required for wind energy development. A solid first step in providing this political commitment is the national co-financing from the Central Government. A second level of political commitment is through the pro-active role of the Metro-Cities (Cape Town, Johannesburg) that are buying green power (as is the case for Cape Town) or will be buying green power (as indicated by City Power Johannesburg) to supply their electricity customers in their respective distribution areas. The green power will be bought at a green premium either through a top up of the normal PPA or through instruments such as Tradable Renewable Energy Certificates (TRECs) and will sold to progressive customers who will fully pay for this green premium. The risks involved in on-selling this green power is partially being covered by a UNDP/GEF financed green power guarantee scheme (see annexes 6 and 7 of the Project Brief). Thus, the financing of the current incremental costs is a combination of national co-financing of the proposed initiative (in the form of an investment subsidy), ODA-based mixed credit schemes and green premiums paid for by progressive customers. For the longer-term however, it is not considered appropriate to continue with investment grants, but the focus will be on production based subsidies. Component 2 of the Project Brief focuses on the development of the most appropriate policy and financial instruments for a longer-term (financial) support from Government to close the incremental cost gap of wind power generation.

g) Regarding wind energy economic cost, it is not clear from the description if the benefits of the fact that employment related to wind energy production is more than twice the employment related to thermal production (table 2) are accounted for. Moreover, it is not clear how these employment numbers came about, if they account for installation, operation and maintenance activities, or also for manufacturing and assembly. Perhaps the document could give more clarity to this respect. All accounted for, a valuable contribution of the present project could be the reassessment of this impact for the South African case. Note especially the strong wind industry that has developed in Spain, Germany and Denmark, creating a quite substantial employment opportunity.

The reviewer refers to a number of parameters that are to be included in assessing the employment benefits of (large-scale) wind energy development. A study carried out by AGAMA Energy in November 2003 entitled "Employment Potential of Renewable Energy in South Africa" (available from the DME: andre.otto@dme.gov.za) has incorporated all these parameters and the results of that study have been included in the Project Brief. The reviewer makes a valid point that for the lessons learned from for example Spain could be important for the discussions whether longer-term, large-scale wind energy development should be actively supported by the South African Government and if so in what format. The Spanish situation as well as the Danish, German and possibly other countries' wind energy development activities over the past decade(s) will be assessed in detail as part of component 1 of the Project Brief.

h) At several locations, e.g. (es3), the document describes the installation and grid connection of the Darling 5.2 MW wind farm by the end of 2005 (or in other places as no later than 6 months after the project start-up), as a firm condition to enter into phase 2 of the project. However, the first phase has a duration of 2 years. Does this mean that the project will be stopped during phase 1 (6 months into the project) if the Darling wind farm is not on line by then? For this reviewer it is also hard to check the degree of realism of this condition. Are turbines selected and ordered? Is a possible turbine selection endangered by recent combinations in the wind industry, i.e. Vestas- NEGMicon, which may discontinue

a line of turbines? What is the lead-time on turbine delivery? Have soil studies been completed, and micro-siting? Without an answer to these questions it is not possible to establish whether this condition is realistic or too strong.

The Project Brief has been updated to provide clarity with regard to the requirements of the Darling wind farm coming on line; i.e. a) financial closure on the Darling wind farm needs to be in place prior to the UNDP/GEF financial contribution will be released (financial closure has been reached during November 2006; b) actual generation of wind-based green power units from the Darling wind farm should be before the end of 2007, however it is anticipated that this will be already before the end of the third quarter of 2007.

In principle the commissioning of the 5.2 MW Darling wind farm can be concluded within six months after financial closure. The turbines have been selected and an order has been put in already for 4 x 1.3 MW Fuhrlander Bonus turbines (so that will not be affected by upcoming mergers in the wind turbine industry). Furthermore micro-siting has been done.

In the unlikely event that the commissioning of the Darling wind farm is delayed till after 2007, the first phase of the project will not stop, but it will finalise its activities as proposed in the Project Brief. Depending on the reasons for the delay of the Darling wind farm, the Project Steering Committee will decided whether the condition(s) related to the Darling wind farm for entering into phase 2 need to be revised or should remain as they are currently formulated.

i) In the estimation of total CO2 emission reduction, the document states 25 years as the lifetime of a wind farm (see chapter A, chapter B (89), annex 2) or even 'anticipated minimum lifetime of a wind farm' in annex 3. It should be observed that the industrial standard still stands at 20 years of technical lifetime. The vast majority of turbines are still designed for a 20 years fatigue lifetime and related extreme loads. In offshore employment there may be a move towards the 25 years, but it is not current practice for onshore turbines.

The lifetime of the turbines has been reduced to 20 years throughout the Project Brief and the emission reduction calculations (Annex 3 of the Project Brief) have been updated as a result of this.

j) The proposed 45 MW of wind power should be installed during the project lifetime, i.e in 2009 or at the latest 2010. However, some paragraphs, i.e. (94) refer to the period 2005 to 2013. This is evidently related to the Government's goal regarding the 10,000 GWh of RE production by 2013. However, stopping wind power deployment in the period 2010 to 2013 would remove the momentum from the development. It would be detrimental to the idea of creating a wind energy industry in South Africa, and hence to the survivability of the proposed SAWEA.

The Project period is 5-year with an anticipated starting date of 1 January 2007 and will thus end on 31 December 2012. Within this time period the development of up to 45 MW of wind power needs to be completed including the financial commitment for an investment grant up to USD 8 million. The actual implementation and commissioning of these 45 MW's could however stretch beyond the 5-year project period, but will most certainly be realised before 2013. The Project Brief has been updated as appropriate to provide more clarity on these time frames.

k) The development over the years of incremental costs for wind energy is estimated in (93), see also figure 3. There is no reference to the source of these estimates, or the logic behind it. Hence it cannot be reviewed. In general this reviewer would like to see more background references and/or explanations where statements of this kind are made. A generally accepted reference regarding market and cost development is the yearly BTM report [6]. For wind farm development costs, a useful reference is [7]

The information as included in the Project Brief has been taken from the reports referred to earlier (see page 1 and 2 of this 'Comments to STAP review') in which proper referencing has been included. The

report entitled "Financing wind farms in South Africa" by Wolfgang Mostert has provided information on incremental costs of wind power generation in South Africa and in calculating these costs use has been made of information from sources such as David Milborrow to whom also the STAP reviewer refers (see reference 7 of the STAP review).

l) The estimation of incremental cost is based on a wind farm total installation cost of US$ 1,200 per kW installed capacity. This is an acceptable value. In fact in [7] this is shown to be the upper limit for wind farms of the 40 to 50 MW range. It would not be prudent to go below this number, for a country that still has to create experience in this branch.

Minor inconsistencies to be removed and suggestions for corrections:

- In the title or description of Figure 1 (16) it should be observed that 'Megawatt installed' shows actually installed generating units and (apparently) their phasing out over the years, without taking into account newly installed capacity over the years.
- In figure 2, (21) the second vertical line should be moved to the left, to the intersection of social cost lines. It could also be noted that the dynamic cost of RETS show a large horizontal part at approximately 0.38 ZAR/kWh, which is probably the wind contribution.
- In (22) table 2 the targeted contribution of bagasse to the 10,000 GWh goal is of 5,952 GWh, slightly higher than the estimated total potential of 5,848 GWh of table 1.
- In (22) the 63 GWh of wind energy production is ascribed to 20-25 MW of installed wind power at a 35-40% capacity factor. In (32) the same amount is related to 15-20 MW of installed power, for the same capacity factor. This should be made consistent. Simple calculations give the following result.

Energy production in GWh for combinations of installed power and CF		Capacity factor CF	
		0.35	0.40
Installed power (MW)	15	46.0	52.6
	20	61.3	70.1
	25	76.7	87.6

- The estimated amount of 20 MW in (33) is the most correct one. Hence a suggestion for 'approximately 20 MW' in both places.
- In 33, detail 'wind class 1' as 'IEC wind class 1', in order to avoid confusion with the Danish DS 472 classes (IEC = International Electrotechnical commission, DS = Danish Standard).
- In (37) change 660 kV into 660 kW for the Vestas V47. Also, change blade length into rotor diameter, the usual manner of unambiguously stating the turbine size: For the V47: 47 m diameter, for the V66: 66 m and for the J48: 48 m. (Rotor radius and blade length are not exactly the same, the difference being the hub radius)
- In Output 6.1 Activities –Phase 1 (97), page 35: change Panamanian Grid to South African Grid
- The numbering after (97) goes back to (95) on page 37
- In (96) (page 25) specify the 3 cents per kWh as ZAR?.

Suggested corrections by the STAP reviewer have been incorporated into the Project Brief as appropriate.

Executive Summary:

Paragraph (es2) 5 lines from below: 'to be produced mainly from biomass, wind, solar and small-scale hydro and non-electric technologies such as solar water heating and bio-fuels and a small contribution anticipated from wind power.' It is suggested to leave out 'wind' at the first occurrence.

The suggested correction has been incorporated into the Executive Summary.

Benefits relations to goals of GEF and regional context and replicability.

The most direct environmental benefit of the project is the reduction of CO2 emissions through energy generated by the wind power installed during the project. Although this will be a very small amount (approximately 100 GWh from the 10,000GWh Renewable Energy already targeted by the SA Government,), the final result of the project should result in many times this amount, if the project succeeds in removing the financial barriers. In that case the plan for further wind energy employment should be much more ambitious than the 200 MW mentioned in annex 1 of [1], see also d) above. A commitment from the national authorities for such a goal may be based both on environmental benefits and on economic benefits, especially the employment aspects. Obviously part of the first phase will be to create awareness concerning this characteristic of wind energy. At the same time, a sizeable market, much beyond the 200 MW in 2020 goal, is a prerequisite for this to come true.

See response provided under d) above.

Viewed this way, the goals of the GEF can be very well served by the project, to introduce a clean energy technology in South Africa with a large potential, and to start a wind energy industry with regional employment benefits. The experience of Spain is a very good example of these two sided benefits.

Replicability will to a large extent depend on the South African wind resource. A high priority should be given to component 4 of the project: Wind resource assessment. The wind resource is the main determining factor in the final energy cost. Where the project brief speaks of measurement campaigns of a minimum period of 12 months, it should be realized that this is indeed a minimum, to include variability due to the seasons. However, having the measuring equipment in place, the additional cost of prolonging the measurements is not very high, while its added value is very large.

The reviewer correctly states the importance of good quality wind resource data and his suggestion to continue measuring after 12 months has been noted and included in the Project Brief (component 4). However, it needs to be noted that continued wind measurements will only be carried out for what is considered a good wind climate for which it is highly likely that the wind energy potential will be translated to actual installation of wind turbines. For a definition of a good wind climate, please refer to the STAP reviewers definition presented under c) above.

3. Sustainability of the program

As stated very clearly in the project brief and in the executive summary, the main threat to the sustainability of the project and consequential activities is the financial cost of wind energy compared to the present generating cost. Components 1 and 2 are crucial for the short-term sustainability, while all other components (3 to 6) are essential for the longer term.
One observation should be made concerning the first component, i.e incremental cost financing. In a number of paragraphs, capital investment subsidies are mentioned or suggested. This is for instance the case in the initial part of the extended paragraph 97, figure 4a and 4b. While these may be essential for the start up of the wind energy activities, one should be warned that for the medium to long term, capital investment subsidies are not the way to a healthy wind energy industry. The only way to optimize energy production is to pay for the energy produced, and not for the machines that are to produce it.

See response under f) above.

Another item that is important for the sustainability is a clear understanding of the grid operator of the impact of wind energy on the grid, and of the different technologies available today to even support the

grid (reactive power management through thyristor based back to back converters). This reviewer suggests to make grid impact studies a part of the project, possibly in component 6.

The reviewers suggestion to include a grid impact study in Component 6 is valid and it has been included as suggested.

For the rest, in this reviewers opinion, paragraph 97 detailing components, activities and deliverables (outcomes) together with Chapter D, describes a feasible way to success in making wind energy sustainable. One important item that is mentioned and should be worked out is an emphasis on economic costs instead of financial costs, and the internalizing of external cost of coal fired thermal generation.

The point made by the reviewer is noted and considered valid. Component 1 of the Project Brief will include this important issue of economic versus financial costs, as this is especially one of the key parameters for longer-term Government support.

4. Linkages to other focal areas, programs and plans in the region

As far as wind energy in surrounding countries is concerned the project brief mentions one more possible project in Southern Africa. This reviewer lacks knowledge of the area to be able to judge if more projects could be envisaged. What is important is that component 2, while necessary for wind energy, will create an enabling environment for all sustainable energies. In the execution of this component, this linkage should be always present.

Component 3 of the Project Brief is an add-on to ongoing activities on renewable energy policy development, including implementation strategies for which financial resources need to be made available. DME is the party that receives and coordinates the various inputs that are being prepared in this regard. For example the World Bank/GEF supported Renewable Energy Market Transformation programme (REMT) is largely involved in this.

5. Degree of involvement of stakeholders in the project

It is promising to see that ESKOM is already experimenting with a number of wind turbines, representing a number of different technology choices: 'optislip' and 'optispeed' for the Vestas machines and variable speed stall control for the Jeumont machine. If so desired by ESCOM, technical assistance in the evaluation of the three machines and their grid impact, could very well be part of the project, under component 6. The generating capacity of these machines is not accounted for in the project although with 3.2 MW they represent a capacity not much smaller than Darling 1.

Results from the ESKOM operations will be closely followed and are considered part of the proposed national wind energy initiative.

Also encouraging is the description of the enthusiasm of potential wind energy developers, see (40). It must be stressed that enthusiasm together with a lack of knowledge may backfire in the long run. Although this reviewer has no way of assessing the level of knowledge of the potential developers, it is strongly suggested to include them in the component 6.

What is worrisome is the large number of stakeholders in the form of provincial and more local authorities (see paragraphs (5) and (6) of [1]) that are crucial in decisions on energy supply. Also for these stakeholders, a capacity building process should be created, pointing out a.o. the environmental benefits of clean energy, its realistic potential and its employment opportunities.

6. Capacity building aspects

As will have become evident from some previous observations, it is this reviewer's belief that capacity building, information exchange and training activities are an absolutely necessary condition for the success of the project. This component 6 is described in paragraph (97), pages 35 to 37. The document dedicated less space to this component than to others.
It is suggested here to include the aspects that were mentioned in previous paragraphs:
Grid impact study.
Capacity building for developers (this is mentioned in output 6.1, but should include more aspects, see below).
Apart from the institutional capacity building described in output 6.2, awareness building for regional and local authorities, see section 6 above of the review.

Additionally this reviewer suggests:
In depth training of developers in wind resource assessment. Too often projects enter into difficulties because of an optimistic estimate of this resource at the site. This should be part of the component 4, i.e. the resource assessment should be done in collaboration between experts and trainees from developers.
In depth training in the different available technologies, their impact on the grid, criteria for selection etc.

Finally, if South Africa would follow the road of Spain, (which perhaps is an optimistic view of this reviewer) in depth technical training at colleges and universities will become a necessary condition. This project should start opening the way for it, see also output 6.1.

In view of the above remarks, the project designers may wish to consider if the allotted budget for this component is sufficient.

The above suggestions made by the reviewer are noted and considered valid. Components 4 and 6 of the Project Brief have been updated as appropriate taking these suggestions into account. Also the budget allocated for these activities has been modified in line with additional proposed activities i.e. USD 200,000 extra for component 4 (wind resource assessment) and USD 300,000 for component 6 (capacity building and institutional strengthening). Consequently component 1 (public sector incremental cost financing) has been reduced by USD 500,000 as it is anticipated that the involvement of other major donors such as the World Bank and DANIDA in these activities will be sufficient to successfully develop and implement activities under this component that will also include wind energy development.

7. Conclusions

In general, the proposed project is seen as a feasible way of initiating wind energy production in South Africa. The reviewer agrees with the project proposal that a firm commitment from national and local authorities is a sine qua non for the success of the project. The steps designed to create a basis for support are clearly described. The reviewer suggests to take a more ambitious stand on the wind energy contribution to the nation's electricity in the long run than the 200 MW in 2020 suggested in the brief. This observation and all other ones in this review are meant to strengthen the proposal and the project.

3. JUSTIFICATION FOR MAJOR CHANGES IN THE PROJECT, IF ANY[2]

No major changes.

4. REQUIRED ATTACHMENTS

a) Project Appraisal Document

[2] Provide justifications for any major amendments in the project, including an increase of project amount exceeding 5% from the amount approved by the Council. Justification for such amendments and the project document will be circulated to the Council for a four-week review period. For procedures to the approval for major amendments, refer to the Council paper: *Project Cycle Update: Clarification of Policies and Procedures for Project Amendment and Drops/Cancellations, GEF/C.24/Inf.5*

UNDP Project Document

Government of South Africa

United Nations Development Programme
Global Environment Facility

Technical Assistance to the
South Africa Wind Energy Programme (SAWEP)

PIMS 1637

Brief Description:

The project goal is to reduce greenhouse gas emissions generated by thermal power generation in the national inter-connected system. The objective is to install and/or prepare the development of 50.2 MW of wind power, resulting in an annual reduction of approximately 105,671 tonnes of CO_2 equivalent. Thus over the lifetime of the wind farms (20 years) a total of 20 x 105,671 = 2.1 million tonnes of CO_2 equivalent will be reduced as direct impact (5.2 MW Darling wind farm) and direct post-project impact (feasibility analysis for up to 45 MW combined wind farm development) of the proposed initiative. Indirect emission reductions, as a result of wind farm developments beyond the 50 MW installed capacity (that are expected to be triggered by the proposed initiative) have been estimated as another 2.5 million tonnes of CO_2 equivalent. Thus the total anticipated emissions reductions are 4.6 million tons of CO_2 equivalent (over 20 years) The project will contribute to national development objectives, i.e.: to diversify power generation in South Africa's energy mix; to set up a wind energy industry that could generate employment and to promote sustainable development by making use of the nation's renewable, natural resources (such as wind).

Originally, the SAWEP project was designed as a coherent 5-year programme to contribute to the removal of the identified barriers, but was split into 2 phases, respectively a 2-year 'Technical Assistance' phase followed by a 3-year combined 'Technical Assistance and Investment phase'. Accordingly, the Executive Summary was approved by the GEF Council in 2004. Reflecting changes in GEF policies and procedures during project preparation, it was decided in 2006 to restructure 'Phase 1' into a stand-alone project (described by this Project Document) with a consistent set of activities that by itself can create sustainably improved market conditions.

TABLE OF CONTENTS

ACRONYMS

APR:	Annual Project Report
CCT	Council of Cape Town
CDM:	Clean Development Mechanism
CEF:	Central Energy Fund
CEO:	Chief Executive Officer (of GEF)
CER:	Certified Emission Reduction
Darlipp:	Darling Independent Power Producer
DBSA:	Development Bank of Southern Africa
DEAT:	Department of Environmental Affairs and Tourism
DME:	Department of Minerals and Energy
DNA:	Designated National Authority (of the CDM, in South Africa: DME)
EDI:	electricity distribution industry
ESI:	electricity supply industry
EIA:	environmental impact assessment
ESKOM:	national power utility in South Africa
FSP:	GEF full-size project
GDP:	gross domestic product
GEF:	Global Environment Facility
GHG:	greenhouse gas emissions
GIS:	geographic information system
GWh:	gigawatt-hour (1 million kWh)
IEC	International Electrotechnical Commission
IPP:	independent power producer
kW:	kilowatt (unit of electric power)
kWh:	kilowatt-hour (unit of electric energy, i.e. the energy created by 1 kW in 1 hour)
LRMC	long-run marginal cost (of electricity production)
M&E:	monitoring and evaluation
MW:	megawatt (1000 kW)
NERSA:	National Energy Regulator of South Africa
NT:	National Treasury
PDF-B:	Project Development Facility-Block B
pf:	power factor
PMU:	Project Management Unit
PPA:	Power Purchase Agreement
PSC:	Project Steering Committee
RCU:	UNDP/GEF Regional Coordination Unit
RE:	renewable energy
RET:	renewable energy technology
RED:	Regional Electricity Distributor
SAWEA:	South Africa Wind Energy Association
SAWEP:	South Africa Wind Energy Programme
TREC:	tradable renewable energy certificate
UNDP:	United Nations Development Programme
UNEP:	United Nations Environmental Programme
UNFCCC:	United Nations Framework Convention on Climate Change

Section I: Elaboration of the Narrative

PART I: Situation Analysis

1.1 Institutional, sectoral and policy context

1.1.1 National level relevant policies; country eligibility and country drivenness

1. The South African Government has adopted a macro-economic strategy, Growth, Employment and Redistribution (GEAR), which aims at promoting growth through exports and investment; and promoting redistribution by creating jobs and reallocating resources through the budget.

2. In terms of energy, the Government has published a White Paper on the Energy Policy (1998), which has the following objectives which specifically support the development of renewable energy (RE) in the energy economy in the medium to longer term:
   - Increasing access to affordable energy services by stimulating the development of new and renewable sources of energy;
   - Improving energy governance by establishing a suitable renewable energy information, statistical and database systems;
   - Stimulating economic development by developing standards and codes of practice for the correct use of renewable energy systems;
   - Managing energy-related environmental impacts by monitoring international developments and participate in negotiations on response strategies to global climate change and investigating an environmental levy on energy sales to fund the development of renewable energy, energy efficiency and sustainable energy activities; and
   - Securing supply through diversity by utilising integrated resource planning methodologies to evaluate future energy supply options and reappraising coal resources and supporting the introduction of other primary energy carriers as appropriate.

3. More recently the government of South Africa has demonstrated its commitment to renewable energy for the production of modern energy carriers that will offer in the longer run a sustainable commercial alternative to fossil fuels:

   (1) In its White Paper on Renewable Energy Policy (2003), the Government clearly formulates a medium-term target for renewable energy as "10,000 GWh renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro. The renewable energy is to be utilized for power generation and non-electric technologies such as solar water heating and bio-fuels. This is approximately 4% (1,667 MW) of the estimated electricity power demand (41,539 MW) by 2013".

(2) The White Paper on Renewable Energy Policy further indicates that the following elements are essential for renewable energy implementation: (a) establishing a proper enabling environment that promotes non-discriminatory of third parties to the grid, (b) having an appropriate regulatory and legal framework for pricing and energy tariffs and integrating Independent Power Producers (IPPs) into the grid system, (c) establishing appropriate financial instruments, (d) promoting development of renewable energy technology, (e) awareness raising, capacity building and education

Recently, significant progress has been made regarding the recognition of renewable energy into the legal and regulatory framework, as indicated below:

BILLS	***Principles/issues that aim to address***	***Operation date***
Electricity Regulation Act	• Achieve the efficient, effective, sustainable and orderly development and operation of electricity supply infrastructure in South Africa • Facilitate investment in the electricity supply industry • Facilitate universal access to electricity • Promote the use of diverse energy sources and energy efficiency • Promote competitiveness and customer and end user choice; and • Facilitate a fair balance between the interests of customers and end users, licensee, investors in the electricity supply industry and the public.	**July 2006**
Energy Bill	• Provide for the establishment of the National Energy Advisory Committee • Provide for the establishment of the National Energy Data Base and Information System • Provide for integrated energy planning • Provide for renewable energy and energy efficiency matters • Provide for the certification and registration of energy service providers • Provide for energy safety, health and environmental matters • Provide for energy access by households • Provide for international energy obligations • Provide for energy research and to provide for matters connected therewith.	Before the end of 2006

(3) In addition, the Designated National Authority (DNA) for the Clean Development Mechanism (CDM) has been established in the DME and is operational. The CDM is expected to create an additional income stream for renewable energy developers, including wind development, with the future option of regulation for the mandatory introduction of renewable energy into the energy economy. This further provides longer-term certainty for wind energy developers and underpins the government's interest in creating an enabling environment for renewable energy.

4. The energy sector has comparatively larger environmental impacts than most other economic sectors. Investments in energy are increasingly subjected to greater environmental scrutiny due to the heightened awareness of these environmental impacts. In this context, energy policies increasingly target a reduction in emissions (within the context of global climate change initiatives) and adverse environmental impacts of energy operations and energy usage.

5. South Africa is a signatory to the United Nations Framework Convention on Climate Change (UNFCCC) and ratified it in 1997. National endorsement for this Project by the GEF Focal Point, the South African Department of Environment Affairs and Tourism (DEAT), has been obtained.

1.1.2 The electricity and grid-connected renewable energy sectors

General overview

6. The South Africa Government is currently implementing significant changes in the electricity supply industry (ESI) and the electricity distribution industry (EDI). ESI reform follows international trends whereby competition and greater private sector participation is being called for (including participation by previously disadvantaged companies or individuals). During the latter part of 1999, the state-owned power utility ESKOM took the first of a series of steps to ensure that it would be ready for the impending restructuring by splitting its business into regulated and non-regulated divisions. The restructuring is important in the context of this proposal since increased privatisation allows larger opportunities for IPPs. The government has recently stated that private firms should generate 30% of future electricity[1].

7. Reform of the EDI is being initiated primarily because the industry is fragmented, with many distributors not being financially viable. Government's policy on the electricity distribution industry (EDI) requires the Distribution Division to be separated from ESKOM and merged with the electricity departments of more than 400 municipalities to form a small number of financially viable Regional Electricity Distributors (REDs). An interim body, called EDI Holdings, will oversee the transition period. The REDs will be subsidiaries of the Holding until they can become independent. They will be responsible for the distribution of electricity and the collection of revenue.

The requirement for additional generation capacity in the short-term

8. South Africa is rapidly reaching the limits of reserves of the national generation capacity. An indication of these generation capacity issues are illustrated in the figure 1 below. There are two issues at stake. First, it is expected that the country will be hitting a peaking crisis by 2007[2] if demand increases as projected. And secondly, the existing 36 GW of generation capacity will require replacement within the next 20 to 30 years. The general observation on these issues is that there is a requirement for some significant investment in new generation capacity – at least 1 GW per annum to meet the demand – and it is Government policy to allocate some of this investment in cleaner generation technologies, such as wind.

1 *The Economist*, 27 January – 2 February 2007

2 The forecast is turning into reality; it has been reported that in 2006-2007 residents of Cape Town and Johannesburg were increasingly plagued by power outages, the 'latest of many and a cause of growing concern'. (*The Economist*, 27th January – 2 February 2007

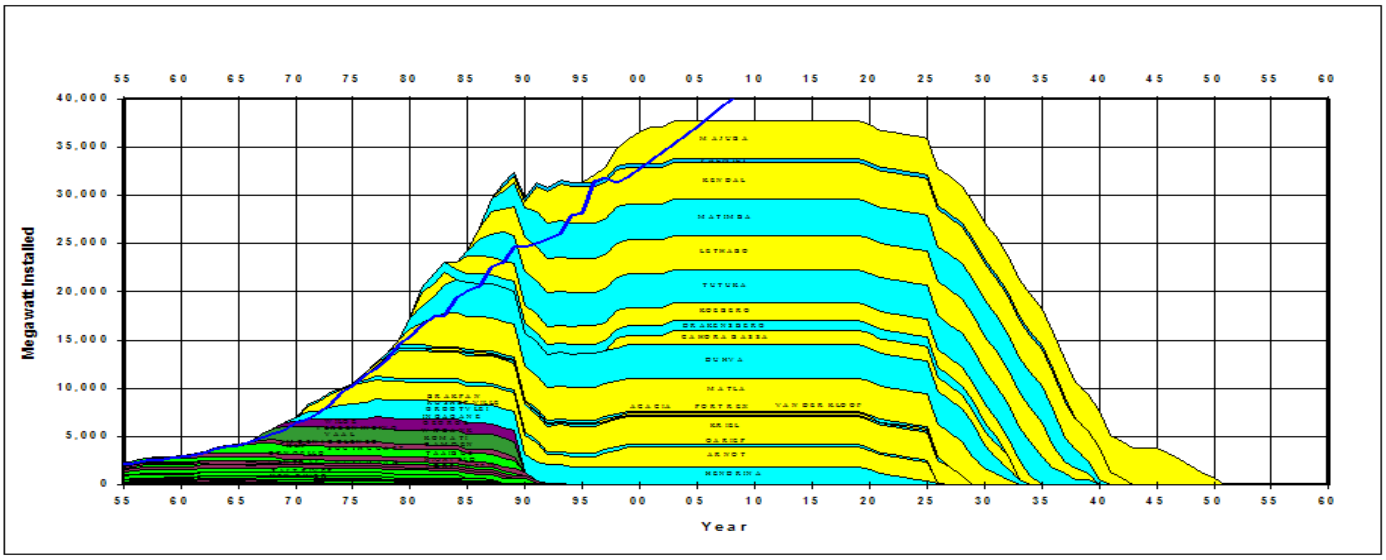


***Figure 1*: Electricity demand projection (blue line) and generation capacity in South Africa**[3].

Renewable energy supply curve and the position of wind in the electricity sector mix in the short term

9. DME´s 'White Paper for Renewable Energy' in South Africa targets a 10,000 GWh contribution by renewable energy (RE) to final energy consumption by 2013. The outcome of a renewable energy supply curve study prepared for DME, 'Economic and Financial Calculations and Modeling for the Renewable Energy Strategy Formulation' [4], estimates the least-cost supply curve for the 10,000 GWh target. It draws up individual supply curves[5] for the most promising renewable energy technologies (RETs) and combines these into the overall least-cost RE supply curve for South Africa.[6]

10. The least-cost investment package identified in table 2 leads to an installed RE capacity in 2013 of 1,670 MW, which is 4% of the year 2013 estimated peak electricity demand of 41.5 GW. If the South Africa Government implements a RE strategy, which phases in RETs according to the least-cost path towards the 10,000 GWh-target, the contribution of wind energy to the RET-generated power supply will be a mere 0.6%, coming from an installed wind farm capacity of approximately 20 MW at 35% capacity factor.

3 Source ESKOM.
4 Conningarth Economists, February 4, 2004.
5 A 'supply curve' shows the relationships between the cost of producing electricity per unit of energy from a technology and the number of energy units (e.g, kWh or GWh) produced per year.
6 The supply curve study ranks 39 renewable energy project categories according to their cost of power production.

11. The bulk (59%) of the least-cost 10,000 GWh comes from bagasse-based heat and power generation. Small-scale hydro and refurbishment of large-scale hydropower provide 10%; solar water heating systems located at commercial buildings about 23%, and landfill-gas based power generation 6%. Thus, 77% of the production is expected to come from RE-based power generation and 23% from replacement of electricity consumption at consumer premises by solar heaters. For RE power generation the cost and price of bulk power from coal-fired power plants is the relevant cost benchmark, for solar heaters it is the retail price paid by business and household consumers.

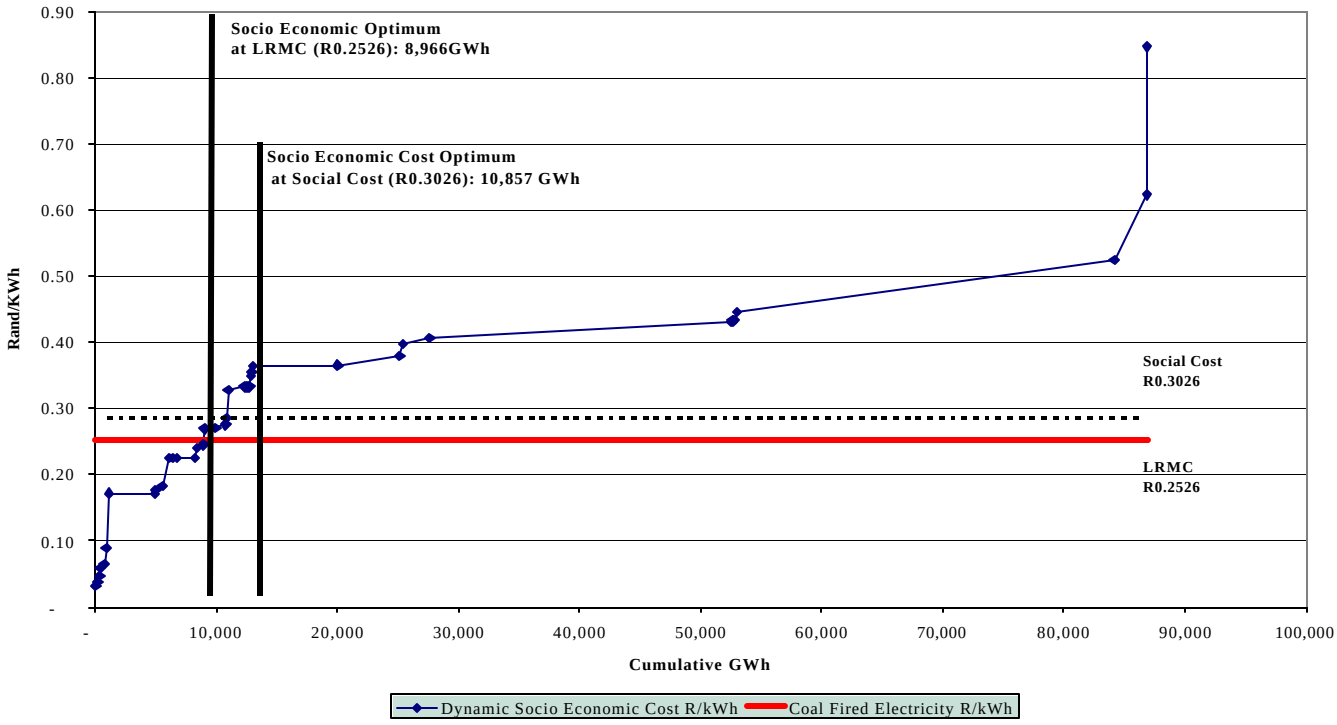


Figure 2: **87,000 GWh Renewable Energy Supply Curve**

Source: Economic and Financial Calculations and Modeling for the Renewable Energy Strategy Formulation; Conningarth Economists, February 2004, pp.12

Item:	Bagasse	Landfill Gas	Hydro	SWH	Wind	New Coal fired Plant
Contribution to the 10,000 GWh target	5,848 (59%)	598 (6%)	1,045 (10%)	2,341 (23%)	63 (0.6%)	-
Dynamic Financial cost per kWh (Rand)	0.10-0.29	0.17-0.29	0.11- 0.34	0.30- 0.35	0.38	0.25
Employment impact (no of jobs) per GWh	4.25	1,73	3.13	2.35	3.12	1.46
CER / CO_2 revenue R/kWh	0.03	0.03	0.03	0.03	0.03	-
Import impact R Mill / GWh	0.05- 0.10	0.07	0.05 -0.07	0.09	0.09– 0.10	0.07

Table 2**: Least-cost composition of the 10,000 GWh with key parameters**

Source: Compiled from: Economic and Financial Calculations and Modeling for the Renewable Energy Strategy Formulation; Conningarth Economists, February 2004.

12. The supply curve report postulates that the optimal market penetration for RET is reached at the point of intersection between the RET supply curve and the long-run marginal cost (LRMC) curve for thermal power of around 0.25 ZAR/kWh (see figure 2). The LRMC is significantly above the average cost of ESKOM's power generation of 0.08-0.10 ZAR/kWh (in 2003). Part of the increase stems from the cost of investment in new power capacity, part of it stems from the higher price paid for higher-quality coal expected to be used in the future. In short, the market price of power will slowly start to increase to the LRMC level, in real terms, as the current oversupply of electricity comes to an end in 2006/7.

13. In the RE supply curve, wind energy is located after the 9,000 GWh-target, close to the cumulative 10,000 GWh-target. The supply curve report, therefore, concludes[7]:
    - that the Government target of 10 TWh reflects the economically optimal penetration of RET in the RSA by 2013 (as discussed above), and
    - that grid-connected wind energy (except for wind farms with an average wind speed of 8 m/s or above, of which there are limited in number) is not economically viable in South Africa in the short tun, at least not based on the current electricity tariff and technology cost.

The position of wind in the electricity sector mix in the longer term

14. In the longer, the supply curve (figure 2) concludes that the technically feasible renewable energy based production equals almost 87,000 GWh, corresponding to about 49% of the electricity consumption in South Africa in 2001. The contribution of RETs generating the 87,000 GWh supply are shown in table 3. The table shows that *up to 74% (!) of the technically realistic RET-potential could come from wind energy*, which makes it *one of the key RET to promote in the longer run*, if the South African Government aims at a significant penetration of RET on the power market.

RE Technology	Potential GWh Contribution	Percentage
Biomass pulp and paper	110	0.1%
Sugar bagasse	5,952	6.9%
Landfill Gas	598	0.7%
Hydro	9,245	10.3%
Solar Water Heating: commercial	2,026	2.0%
Solar water heating: residential	4,914	6%
Wind	64,102	74%
TOTAL	**86,843**	**100%**

Table 3: **Renewable energy technologies and 87,000 GWh renewable energy potential in South Africa.**
Source: Economic and Financial Calculations and Modeling for the Renewable Energy Strategy Formulation; Conningarth Economists, February 2004, pp.5

15. To address the energy cost implication (current low generation cost from coal vis-à-vis high cost of energy generation from RE technologies) the South African Government has adopted a phasing-in process of RETs based on a least cost option. This means that the bulk of wind energy will be phased-

in from 2013 and onwards. Looking beyond the short-term of goal of 10,000 GWh (by 2013), wind energy is one of the RET with the technical-economic potential for achieving a significant penetration on the power market on the longer term due its potential energy generation potential (see table 3). The increase in financing new generation capacity and technology cost coming down with scale of economies combined with green premiums and other financing mechanisms such as CDM, feed-in tariffs or capital subsidies will greatly increase the possibilities for wind power development in South Africa in the short to medium term. A heavy emphasis on creating a green power market and developing of financing mechanisms are therefore of utmost importance.

Current status of wind energy development in South Africa

The Klipheuwel, ESKOM wind energy technology demonstration site

16. In 2002, ESKOM erected three wind turbines at an experimental wind energy farm at Klipheuwel on the West Coast near Cape Town. The technical potential of wind energy as part of the electricity generating mix is being examined as well as the evaluation of different wind-based technologies[8]. The experimental farm includes a 660 kW, a 1.75 MW and a 750 kW wind turbine.

17. In summary this is a technology demonstration project to assess the mechanical and electrical performance of different turbines, including grid-connection issues. This should not be considered a basis for replication for commercial projects, but certainly its results on technical performance on and off the electricity grid will be useful information for other wind energy developments in South Africa as well.

The Darling 5.2 MW wind farm National Demonstration Project

18. The Darling 5.2 MW project is the best-known example of more commercial-oriented wind energy development in South Africa. Darling Phase 1 (comprised of four 1.3 MW turbines) has been in development for more than 6 years. The project has been designated a 'national demonstration' project by the Minister of Minerals and Energy and has received substantial grant support from Denmark (DANCED and DANIDA) and investment by the Central Energy Fund (CEF) and the Development Bank of Southern Africa (DBSA). The grant subsidies were used to cover development costs, including wind resource measurement, and an investment subsidy.. Financial closure was reached in November 2006. The project is currently finalizing wind turbine tender negotiations and construction will commence in the 1st quarter of 2007. Commissioning of the wind farm is anticipated before the end of the 2nd quarter of 2007.

19. The biggest breakthrough for the Darling wind farm project has been the power purchase agreement (PPA) of the owner, the Darling Independent Power Producer (Darlipp) with the Cape Town Metropolitan Council (CCT), which agreed to buy power from the project at a green premium double the average tariff at which it buys power from ESKOM. This is part of the Council's commitment to reach a self-imposed target of buying 20% of its electricity purchases from renewable sources by

[8] The project is owned by ESKOM's Resources and Strategy Division and construction and ongoing research managed on their behalf by ESKOM Enterprises TSI (Technology Services International). Peaking Generation, part of ESKOM's Generation Division, is operating and maintaining the turbines during the three year research phase.

2020. The Cape Town PPA has been signed for a period of 20 years (the PPA is attached in Section V).

'Second' generation wind energy projects identified during the PDF-B preparatory phase

20. Part of the PDF-B activities included a pre-feasibility assessment of a number of proposed wind energy projects in South Africa. The purpose of this pre-feasibility or 'quick scan' assessment was to apply international experience on developing wind energy projects in developing countries to assess the barriers facing wind energy developers in South Africa. A preliminary viability assessment of the 4 projects was carried out:

Project Name	**Size**
Darling Wind Farm, 2nd Phase (consisting of a further six 1.3 MW turbines)	7.8 MW
False Bay	20 MW
Langefontein	115 MW
Jeffrey's Bay	7 MW

21. The impressions gained from the quick scan assessments is that wind park development in South Africa will not be easy, given the barriers listed in the next paragraph 1.2.1. Despite this, it was noted that there is an enormous personal drive and motivation of the respective developers. The mere fact that there are developers proposing wind farms within the current market conditions speaks more of their optimism and belief in wind energy and their ability 'to make it work', than of the current viability and competitiveness conditions. In the end, a motivated developer is the single most essential component that is needed in getting a project implemented in such ostensibly adverse conditions, as is shown by the Darling Phase 1 example.

1.1.3 Provincial and local level relevant policies

22. Local authorities – metropolitan, municipal and district councils – have a critically important role in terms of energy service provision. First, they are constitutionally mandated to distribute and supply electricity to customers in their area of jurisdiction. This means that they are currently the sole electricity service providers to the bulk of the consumers in the country. Any sales of Green Power or Green Electricity will need to be made by them or with their approval. Second, the local authorities are required to develop integrated development plans which imply a need to consider the role of energy and the potential to develop new generation capacity. For example, the City of Cape Town has already developed a Local Authority Energy Strategy[9] which identifies renewable energy generation as a priority.

23. Although the local authorities have traditionally provided a purely technical and financial services function in terms of electricity supply, there is significant institutional and individual capacity to engage in new energy services and generation projects. The transformation of City Power in

[9] Available for download from www.sustainable.org.za

Johannesburg Metro from a technical and financial service department into a corporatised service provider is an example of how the capacity at local authority level is evolving towards more effective service delivery.

1.2 Barrier and baseline analysis

1.2.1 Barriers to wind energy development in South Africa

24. Barring unique technical and financial conditions, wind energy is currently not competitive. Under present conditions in South Africa one cannot build a wind farm, sell power under a long-term Power Purchase Agreement (PPA) and be able to service the project's debt or provide a competitive return to the project's investors. This lack of viability is due to a number of structural barriers of the South Africa energy sector in general and for renewable energy in particular.

Regulatory and institutional barriers

a) *Non-transparent power market and regulatory framework*
The South Africa power generation sector has been on the verge of restructuring for the past decade. The distribution sector is slowly moving to the proposed system of regional electricity distributors (REDs) replacing the hundreds of present distributors, but there is a large measure of uncertainty in the market: how will new generation be introduced and how will new buyers (REDs) behave? It is extremely difficult trying to secure long-term debt in such a market where PPA prices may suddenly change and the regulatory framework for generation is still evolving. In addition, the risk exists that the power sector will be structured to only promote large-scale conventional generation or just have one set of rules discriminating unfairly against small-scale and distributed generators such as wind farms.

b) *Government's implementation strategy for the RE policy*
Whilst government has published a "White Paper on Renewable Energy" for the period up to 2013, no detailed policy instruments have been defined to facilitate this. Many other countries have already put such instruments in place, such as for example "feed-in" tariffs (Germany) or compulsory quotas on renewable energy certificates (Australia). The lack of such mechanisms in South Africa creates uncertainty as to the level, format and quantum of government support for renewables.

c) *Environmental Impact Assessments (EIA)*

Although there is no specific energy competency required for the Provincial Governments in the Constitution of South Africa, the Provincial Governments exert a strategically important role in approving the Environmental Impact Assessments (EIAs), which are required for planning and approval of wind farms. The ability to reject EIAs – as initially happened in the case of the Darling 5.2MW Wind Farm – has already indicated the potentially obstructive role which provincial governments can play. One problem here has been the definition of the EIA process, which requires the evaluation of alternative sites for any project activity. However, wind energy projects are developed for *one* specific site, because the right wind conditions exist at that spot. Having to present and evaluate alternatives power generation sites is often not a reasonable criterion for the wind project to meet, delaying its preparation time and increasing preparation

cost[10]. In the case of the Darling project, relevant environmental laws and regulations were still being reviewed and updated during the application for the EIA permits, causing further delays.

Financial barriers

a) *Absence of any green power instruments in the South African energy sector*
In the current South African energy sector there are no wide-spread available green power instruments (green PPA's, green premiums, green power feed-in tariffs, a compulsory fixed percentage green power of the energy mix, fixed minimum percentage of green power consumption by e.g. public sector institutions, etc.) that could be used to reduce or even fully close the gap of the incremental costs.

b) *Average wind speed regime*
The bulk of South Africa's wind energy potential lies in an average wind speed regime of 6-7 m/s. Such wind speeds implies capacity factors of 24% to 27%. A typical developing country wind farm with a capacity factor in this range needs a PPA of US$ 0.08-0.10/kWh (i.e. ZAR 0.55-0.65/kWh) to be financially viable. A lower capacity factor also reduces the capacity credit earning potential of a wind farm. A limited number of sites exists where winds speeds are in the range of 7-8 m/s. For these sites production costs may be in the range of ZAR 0.40-0.50/kWh (however such sites will be the exception considering the average wind speed regime in South Africa).

c) *Low energy prices*
Currently, South African electricity prices are currently the lowest in the world. This makes it difficult for adding any new installed capacity (renewable as well as non-renewable) on a commercial basis. Prices are anticipated to rise over the next 10-15 years as discussed earlier in paragraph 1.1.1. The LRMC of new generation capacity is widely estimated at US$ 0.038-0.043/kWh (ZAR 0.25 to 0.30/kWh). However, even with higher rates for new generation, wind energy still faces a financial shortfall. Currently the best PPA a wind park can achieve is US$0.025/kWh (ZAR 0.15/kWh). This is only about 30-40% of the income needed to make the project financially viable. The financial gap has to be closed by other means, such as green power purchasing.

d) *High cost of capital*

A wind energy project is capital intensive with low operational costs compared to conventional fossil fuel-based generation. Whereas a conventional project faces ongoing fuel costs, a renewable energy project faces high financing costs, in terms of interest and loan repayments. Financial viability is therefore strongly dependent on interest rates. In South Africa, these rates (at the time of writing) are still more than double (10-12%) than what is available on the international market (around 5-6%). Wind energy projects in South Africa therefore face far higher financial costs than projects elsewhere that can borrow on the international market. Another factor is that all PPA's are denominated in South African Rands (ZAR) and not in US Dollars or Euros; thus, foreign investors would have to take the exchange rate risk of earning in ZAR's and repaying debt in hard currency (US Dollars or Euros).

[10] Lack of knowledge regarding the possible environmental impacts of wind energy projects was another problem, apparently a commonly held view in South Africa of wind turbines is as giant bird chopping machines. This is unfounded, because turbines have lower incidences of bird fatalities than high power lines, roads and glazing.

e) Under-financed project development activities

Most project developers in South Africa are seriously under-financed during the project's development phase. It will cost a developer anything between ZAR 1 -2 million to move from concept stage to financial closure. Few, if any, developers have such deep pockets to bear preparation costs, such as wind speed measurements, feasibility analysis, financial modelling and legal fees, at their own risk. As shown in the case of Darling, some development cost, such as for the environmental impact assessment (EIA) can turn unrealistically high. A cost-sharing programme to assist developers reducing their high risk could go a long way to improving the nature and status of the wind energy pipeline in South Africa.

f) Lack of interest and involvement of financial institutions

Since wind energy projects proposed in South Africa are financially marginal at best, most financial institutions are not willing to incur debt exposure on these projects. Few wind energy projects can show the cash flow and debt coverage required to meet standard lending criteria. In addition most of the wind energy projects are small in terms of their financial needs and therefore do not measure up to with standard non-recourse financing transaction size.

Information, knowledge and capacity barriers

a) Information on wind energy resource

Estimates of wind power potential for South Africa were done by Rosanne Diab at the University of Natal and published as the wind atlas for South Africa (1995)[11]. This kind of macro level wind atlas is of very little use to prospective wind warm developers apart from indicating that the most favourable wind regime is situated along the coastal strip. The lack of reliable wind resource information is a barrier for private developers in terms of site selection and is also a barrier for provincial and national policy making with regard to wind energy development. Without a clear assessment on the wind energy potential it will be difficult for National Government to allocate long-term (financial) support to wind energy development in South Africa.

b) Capacity of developers

Most developers in the wind energy sector generally come from outside the project development business, most often from the ranks of NGO's, researchers or renewable energy enthusiasts. These developers most often do not have project development or financial experience and are too under-resourced, resulting in complex and inefficient structuring of projects and extended project development duration, thus pushing up a project's development and transaction costs and limiting the interest of the commercial financial sector in the projects.

c) Capacity of local consultants

Developers are severely restrained by the lack of sufficient numbers of skilled local consultants to advice on various components of the project's development needs. External consultants are typically required for activities, such as wind energy feasibility assessment, wind resource measurement and assessment and legal, environmental and financial issues. Currently, some tasks are completed by the developer himself and, in cases where local external consultants are used (EIA's and wind measurements), the cost has proven to be higher than can be expected internationally and the level of service lower.

[11] *Generalised map of wind power potential in South Africa,* Diab (1995)

d) Institutional capacity

There is almost no institutional capacity in South Africa for dealing with new Independent Power Producers (IPPs). Local, provincial and national government structures and departments have no experience in reacting to these new (renewable) energy sector developments. The energy sector regulator (NERSA) has been in place for less than 10 years and has been focusing up to now almost exclusive at distributional issues rather that on adding new generation capacity. However, implementing a independent renewable energy projects will require institutional response and involvement on numerous issues including EIAs, PPAs, subsidy support, generation licensing and wheeling arrangements. At present, any wind energy developer faces an uphill struggle in gaining the necessary institutional support and response required.

1.2.2 Baseline situation

25. South Africa is rapidly reaching the limits of reserves of the national generation capacity. Already, current installed capacity seems to have reached it peak power demand limit. In addition, the existing 36 GW of generation capacity will require replacement within the next 20 years. Traditionally, the response for meeting South Africa's increasing electricity demand would have been increased investment in thermal power plants, with (clean) coal and natural gas, and to a lesser extent increased imports of large-scale hydro power. This would result in an important increase of GHG emissions from the electricity sector. However, South Africa's government recognizes that emissions of greenhouse gases from the use of fossil fuels leads to increasing concerns about climate change. Its 'White Paper on Renewable Energy' aims at a 10,000 GWh renewable energy contribution to meet final energy consumption by 2013. This is approximately 4% (1667 MW) of the estimated electricity peak power demand (41,539 MW) by 2013, equivalent to replacing two (2 x 660 MW) units of Eskom's coal-fired stations.

26. A recent study estimates the least-cost supply curve for this 10,000 GWh target, favouring biomass, sugar bagasse and landfill gas as options for heat and power generation first. The RE supply curve wind energy is located after 9,000 GWh, supplying only 1%. However, looking beyond the 2013 target, the potential of wind becomes substantial when these cheaper options will have been exhausted, representing 74% of the renewable energy potential in South Africa (see paragraph 1.1.2).

27. There are in principle two major *approaches* that could be followed by the Government of South Africa in developing the wind energy potential of the country. In the *baseline approach* (as described before), the economically wind potential of about 20 MW will only be phased in on the medium term. The advantages are that relatively limited financial resources have to be made available from Government and prices per MW installed capacity may have come down. The disadvantages are that no basis for a wind energy industry will be developed over the coming years. Thus, by the time that the 20 MW wind farms needs to be developed, say by 2011-2012, none of the above-mentioned policy, institutional, financial and other barriers will have been addressed. This will cause huge delays in wind power development, as has been clearly evidenced by the Darling wind farm development experience. In addition, the current momentum created with a number of private developers, building on the Darling wind farm national demonstration, will be fully lost.

PART II: Project strategy

2.1 Project rationale and policy conformity

28. The *alternative approach* would be a gradual phasing in of wind energy up to about 45 MW over the period 2005-2013 (i.e. up to total installed capacity of 45 MW will be up and running in 2013), while simultaneously addressing the before-mentioned barriers to wind energy development. This will create a solid basis for further expansion of wind energy after 2013, mainly because of the critical wind farm capacity (45 MW) established for considering investments in local manufacturing and moreover it will make it possible to spread the development of wind energy over a number of sites across the country, thereby creating multiple 'breeding grounds' for wind energy expansion. More ambitious and long-term targets for wind beyond the immediate target of 50 MW are expected to emerge from the ongoing political process.

29. The alternative approach is proposed to be actively supported by the UNDP/GEF SAWEP initiative, in recognition of the fact that wind energy has a significant potential in Southern Africa and that a step-by-step approach is the most appropriate. Proposed wind power developments (to be spearheaded with the four examples presented earlier in paragraph 1.1.2) will not move forward due to the existence of the presented barriers. To remove the existing financial, policy, regulatory, institutional, information and specific wind energy development capacity constraints as well as economic costs, the donor-community (including UNDP/GEF) can provide financial assistance for the short-term (2-5 years) alongside long-term (Government-based) financial assistance to close the financing gap in the long run.

30. Since it cannot be reasonably expected that South Africa will implement wind power without any short-term help from donors, support from UNDP/GEF has been requested. A project Executive Summary for the South Africa Wind Energy Programme (SAWEP) was prepared and approved by the GEF Council in November 2004. A more detailed Project Document (in UNDP format) was drafted as well. One condition for obtaining the final CEO endorsement has been a revision of the Project Document to include recent comments by the GEF Secretariat (as given in the GEF Secretariat Concept Agreement Review) as well as reflecting changes in GEF policies and procedures over the preparation period of SAWEP. Another condition has been the signing of the purchase power agreement of the Darling 'Phase 1' 5.2 MW wind farm with the City of Cape Town. As discussed before, the preparation of the Darling wind farm has met substantial delays. Financial closure was reached in November 2006 and construction will commence in the 1st quarter of 2007. Commissioning of the wind farm is anticipated before the end of the 2nd quarter of 2007.

31. The main barriers for the deployment of wind power projects are inter-related and cannot be removed separately. The Executive Summary of the SAWEP project details a two-phased approach to tackle the barriers to wind development and promoting the gradual phasing in of wind energy over the period 2005-2013. The first phase of 2 years would focus on, among others, making available 'technical assistance' to the South African Government in terms of development of the most appropriate financial and policy instruments.

32. The reasoning is that few commercial developers will be interested in wind development without an appropriate policy, institutional and regulatory framework for grid-connected wind energy. Lack of

institutional capacity is causing serious delays and misdirection of projects where developers are forced to focus on these institutional barriers rather than on the project's financing and securing the necessary resources for the project's development. For example, the lack of knowledge with provincial and central Government with regard to wind-energy-specific EIA's is a serious barrier that needs to be addressed in order for smooth processing of EIA for wind farm development.

33. This would create a solid basis for the Government to take a decision on the longer-term support for renewable energy, including the policy and implementation strategies to be followed. Based on such a commitment, a second phase would be entered into (of course, subject to a second GEF Council approval), gradually shifting its focus from 'technical assistance' to 'promotion of investment' in wind energy, targeting the development of up to 45 MW of installed wind power.

34. The first versions of the UNDP Project Document describe in detail the combined objectives, outputs and activities of both phases 1 and 2, including detailed incremental cost and logical framework matrixes for both phases. Following the GEF Secretariat suggestions in the Concept Agreement Review, this final version of the Project Document describes the first phase of 'technical assistance' to SAWEP only. The argument is that the realization of a follow-up (second) phase, financed by UNDP/GEF and/or other donors, is by no means certain. Therefore, the outputs and activities proposed in the 'technical assistance' (first) phase in this final version of the Project Document have been restructured in order to have a closed set of activities that by itself lays the first groundwork for future wind development whether or not followed by a second investment-support phase (that would more specifically addresses the financial barriers in greater detail).

35. The SAWEP Project has been submitted under Operational Programme 6 (promoting the adoption of renewable energy by removing barriers and reducing implementation costs) and will contribute in meeting the following strategic priorities:
    - *CC-2: Increased access to local sources of financing for renewable energy and energy efficiency:* demonstrating how combined green market instruments and active financial Government support will create the basis for long-term wind energy developments; and
    - *CC-3: Power sector policy frameworks supportive of renewable energy and energy efficiency:* to mobilize the interest of the private sector into the financing and construction of wind farms, through the creation of sufficiently interesting incentives (policy and financial).

36. The project is designed with a strong focus on learning lessons from the investment in the Darling Phase 1. The installation and operation of the 5.2 MW Darling wind farm will directly avoid the greenhouse gas emissions that would otherwise be generated by thermal power generation in the national inter-connected system, resulting in an annual reduction of approximately 10,946 tonnes of CO2 equivalent (tCO2). In addition, the likely post-project investments in 45 MW of wind power (for which feasibility studies will be supported by the SAWEP FSP) will result in 94,725 tCO2. Thus over the 20-year lifetime of the wind farms (50.2 MW), a total of 20 x 105,671 = 1.9 million tCO2 equivalent will be reduced as a direct impact of the here proposed initiative. Indirect emission reductions, associated with the barrier removal activities of the proposed SAWEP initiative have been estimated as another 2.5 million tCO2 (see annex 1 in Section IV for more details on the emission reduction calculation). Thus the total anticipated emissions reductions are 4.6 million tCO2 (over the assumed 20-year lifetime of a wind farm).

2.2 Project goal, objective, outcomes and outputs/activities

37. The goal is to reduce greenhouse gas emissions generated by thermal power generation in the national inter-connected system. The project objective is to install and operate up to 5.2 MW Darling wind farm and prepare the development of 45 MW combined wind farms.

38. The project will contribute to South Africa's national developmenmt objectives, e.g. by diversifyingf power generation in South Africa's energy mix; by setting up up a wind energy industry that could generate employment and by promoting sustainable development by making use of the nations' renewable and natural resources.

39. The project has been divided into six main outcomes to contribute to a first lowering of the identified barriers within a full-size project of a two-year period. Each component is associated with specific outputs and a set of activities. By successfully implementing activities under these six outcomes the project will contribute towards the achievement of the project goal and objective.

- *(1) Increased public sector incremental cost funding,* by assisting the Government of South Africa with detailing the most appropriate financial instruments that should be made available to stimulate commercial wind energy developments;
- *(2) Green power funding initialised,* by assisting initiatives geared towards green power marketing and setting up and implementing Tradable Renewable Energy Certificates (TRECs) as well as implementing a green power guarantee scheme developed under the PDF B;
- *(3) Long-term policy and implementation framework for wind energy developed,* by assisting the Government of South Africa;
- *(4) Wind resource assessment,* by assisting interested public and private sectors entities with the generation of reliable wind energy data and other necessary information for wind energy development;
- *(5) Commercial wind energy development promoted,* by assisting private sector developers with the (pre-) feasibility of a number of wind farms up to 45 MW installed capacity.
- *(6) Built capacity building and strengthened institutions*, such as key government departments (e.g. national and provincial environmental departments), public agencies (e.g. financing), wind farm industry (e.g. South African Wind Energy Association) and independent private firms involved in wind energy development.

40. The components are related to the barriers previously identified as follows:

Type of barrier	**Component**
Financial	Components 1,2,5
Regulatory and Institutional	Components 3,6
Information, knowledge and capacity	Components 4,5,6

***Table 4*:** Barriers and full-size project components.

41. The outputs and activities associated with each outcome are detailed below:

Component 1: Public sector incremental cost funding set up

Output 1.1: Detailed financial instruments to stimulate commercial wind energy developments have been designed and accepted for implementation by the Government

Activities

- A detailed assessment on possible Government policy and financial instruments – building on the outputs of the PDF B activities – will be undertaken during the full-size project (FSP). The emphasis will be on designing policies, implementation strategies and financial instruments that focus on production subsidies rather than investment subsidies. Valuable lessons from Spain, Germany and Denmark can be learned that could be adopted to meet the South African conditions. As part of the FSP, it will be necessary to present the outcome of these assessments to senior government decision makers at Department of Mining and Energy (DME) and the National Treasury (NT) for information, review and comments;
- Based on the feedback and comments received from the above activity the financial instruments (e.g. green PPA's, green premiums, green power feed-in tariffs, government capital investment grants, a compulsory fixed percentage green power of the energy mix, fixed minimum percentage of green power consumption by e.g. public sector) will be designed and detailed as appropriate after which they will be presented for another round of comments, followed by revision and detailing. It is anticipated that 2-3 rounds as described here will be needed for reaching acceptable financial instruments for stimulating wind energy developments; and
- Initiating the process of formal approval of the designed financial instruments by the relevant South African authorities.

The cost of component 1 is estimated at US$ 155,000 and divided as follows:

Source and type of funding	**US$**
GEF	110,000
Government of South Africa in-kind funding	45,000
Total	**155,000**

Component 2: Green power funding initialised

Output 2.1: Green power guarantee scheme designed under the PDF B has been fine-tuned and is under implementation in the City of Cape Town

Activities[12]*:*

- The Green Power Guarantee Scheme that has been prepared as part of the PDF B activities (see Annex 3) will be presented to senior management of the distribution company and municipality of

[12] Please note that the earmarked funding for the green funding schemes amounts to USD 560,000

Cape Town for information, review and comments (after which these comments will be incorporated into a final version);

- Design and put in place the necessary implementation structure for the Green Power Guarantee Scheme and commence implementation which is anticipated latest for the 2nd quarter of the implementation of the full-size project;
- Continuous monitoring of the implementation of the scheme and using the information gathered to improve its implementation set-up as well as to design similar schemes for other urban centres; and
- Initiate discussions and a possible design of similar schemes for City Power (City of Johannesburg) and initiate discussions with other urban centres such as Pretoria, Durban, etc.

Output 2.2: Green power marketing activities for selected urban centres are designed and actively supported by UNDP/GEF

Activities

- Assist with the implementation of the planned green power marketing activities of the City of Cape Town;
- Assist with the design and implementation of green power marketing activities for City Power (the distribution company of the City of Johannesburg) and other cities. This activity will be largely based on anticipated successful implementation of similar activities in Cape Town; and
- Closely monitor, analyse and document the green power marketing activities in Cape Town and Johannesburg (and other cities) and make the information available to a wider audience.

Output 2.3: A system for Tradable Renewable Energy Certificates (TREC) has been designed, set-up and under implementation

Activities:

- A detailed, nation-wide green power[13] market survey will be carried out, building on the outcome of similar activities - but limited in scale and coverage – implemented under the PDF B;
- The design and setting up of a TREC-system that can realistically be implemented in the South African context. This will be based on activities carried out under the PDF B in combination with lessons learned from TREC-systems in Europe and Australia;
- Apply – as a test case – the TREC-system for the Cape Town (voluntary) green power purchase from the 5.2 MW Darling National Demonstration Wind Project;

The cost of component 2 is estimated at US$ 1,245,000 and divided as follows:

Source and type of funding	**US$**
GEF	640,000
Cities and municipalities cash funding (City of Cape Town)	580,000
Government of South Africa (NER, REDs) in-kind funding	25,000
Total	**1,245,000**

[13] Please note that the concept of 'green power' is wider than wind power. All TREC related activities will be based on voluntary purchasing of green power by (progressive) residential, commercial and industrial customers

Component 3: Long-term policy and implementation framework for wind energy developed

Output 3.1: A long-term policy for wind energy, including an implementation strategy and policy (financial) instruments has been designed and accepted by the Government for inclusion into their overall renewable energy policy and implementation strategy

Activities:

- As part of the SAWEP full-size project (FSP) it will be necessary to detail the assessments made under the PDF B on possible Government policy and financial instruments to stimulate wind energy development. The results will be presented to senior government decision makers at the Ministries responsible for renewable energy (DME, NT and DEAT) for information and review;
- Based on the feedback and comments received from the above activity, assistance will be provided to make recommendations for an inclusion of wind energy into the overall long-term renewable energy policy and regulatory framework.

The cost of component 3 is estimated at US$ 145,000 and divided as follows:

Source and type of funding	**US$**
GEF	100,000
Government of South Africa (DME, NER, DBSA, REDs) in-kind funding	45,000
Total	**145,000**

Component 4: Wind resource assessment

Output 4.1: Wind measurements and monitoring at 20 sites has been supported

Activities:

- Support and facilitate the development and recommendation of national wind farm selection criteria/guidelines with the required national representative support basis; and
- Analyse existing wind data making use of international standard software packages for such analysis; Present the data in a format that can be understood by a broad audience and disseminate the information free of charge; Refine the analysis of the data making use of international standard software packages. Present the data in a format that can be understood by a broad audience and disseminate the information free of charge;
- Update the current wind resource map of South Africa based on information collected and wind modelling and correlate with long-term information from weather stations and airports. Make the wind resource map available free of charge.

Output 4.2: Up to ten private developers have been assisted with their wind measurements for sites identified for commercial wind farm developments

Activities:

- Assist up to a maximum of ten private wind energy developers with their wind measurements, up to an amount not exceeding 50% of total cash and in-kind costs per wind site. The wind farm developers will be selected according to appropriate Government/UNDP/DBSA selection process

and criteria. SAWEP aims at the development of 45 MW. Minimum duration of the wind measurements should be 12 months, but will be longer if the wind climate is considered good. The data collected will be owned by the private developers and will not be made publicly available without written consent of the private developers.

The cost of component 4 is estimated at US$ 355,000 and divided as follows:

Source and type of funding	**US$**
GEF	310,000
Government of South Africa in-kind funding	45,000
Total	**355,000**

Component 5: Commercial wind energy development promoted

Output 5.1: Private developers have been assisted at a pre-feasibility level with project development activities for wind power development up to 45 MW

Activities:

- Assist up to a maximum of six private wind energy developers with their pre-feasibility study, up to an amount not exceeding 50% of total cash and in-kind costs of the study with a maximum financial GEF contribution of US$ 5,000 per 1 MW installed capacity. The total UNDP/GEF support is limited to 45 MW; i.e. a maximum of US$ 225,000.

The cost of component 5 is estimated at US$ 9,804,000 and divided as follows[14]:

Source and type of funding	**Phase 1**
GEF	300,000
Darling 5.2 MW National Demonstration Wind Project – cash funding made available through equity, debt and a grant contribution (DBSA, Danida, Darlipp)	6,804,000
Government of South Africa (banks, REDs, NER) in-kind funding	45,000
Government of South Africa (CEF equity investment)	2,655,000
Total	**9,804,000**

[14] Contributions by DBSA: ZAR 25.512 million (US$ 3.495 million), Danida: DKK 15 million (US$ 2.609 million), Darlipp: ZAR 5.11 million (US$ 700,000) and CEF: ZAR: 19.38 million (US$ 2.655 million) converted at Febr '07 exchange rate of US$ 1 = ZAR 7.3

Component 6: Built capacity and strengthened institutions

Output 6.1: The technical capacity of the main actors involved in wind power generation has been strengthened

Activities:

- Design and implementation of a training programme for potential wind power developers, DME, ESKOM, technical colleges/universities and the distribution companies. This includes training modules on design, construction, grid-connection, operation, and maintenance of wind power plants and the effects and limits of wind energy for the South African grid. This activity will be at the national and provincial levels;
- In-depth training of developers in wind resource assessment. Too often, projects enter into difficulties because of an optimistic estimate of the wind resource at the site. This activity should be carried out in close collaboration with component 4; and
- In-depth training on available wind technologies, impacts on the grid, criteria for selection, etc.

Output 6.2: The South African institutional capacity of the key institutions involved in renewable energy (power) development has increased

Activities:

- A large number of stakeholders in the form of the utility (ESKOM), and provincial and local authorities are crucial in decisions on energy supply. For these stakeholders, an awareness raising and basic capacity building programme will be designed and implemented among others focusing on environmental benefits of wind energy development; its realistic development potential and employment opportunities; and
- Strengthening of the agency responsible for environmental management; i.e. DEAT, at central and provincial levels. The focus will be on areas such as EIA for renewable energy power generation and methodologies for designing and applying an approach to integrate environmental, economic and social aspects of renewable energy power generation.

Output 6.3: The South African Wind Energy Association (SAWEA) has been strengthened and institutionalized

Activities:

- Strengthen the capacity of SAWEA through targeted training and information exchange with overseas wind energy associations such as those in Europe (Germany, Denmark) and Canada; and
- Provide financial assistance to SAWEA to ensure that a programme can be prepared and offered to its members that adds value and creates a basis for active paid membership in the near future.

Output 6.4: Lessons learned from experiences in South Africa have been distilled and disseminated to a larger audience; a follow-up phase has been formulated

Activities:

- DME will organize at minimum every year a workshop to make available the results of the SAWEP FSP to a larger audience within the renewable energy and electricity sectors in South

Africa. Three main elements to be dealt with during these workshops a) energy pricing mechanisms for green power, b) transmission and possibly distribution aspects of intermittent power in a wholesale power market, and c) status update on wind power developments specifically (wind measurements, wind map updates, wind power licensing, wind farm developments, etc).

The cost of component 6 is estimated at US$ 112,500 and divided as follows:

Source and type of funding	**US$**
GEF	179,500
Government in-kind funding	7,500
Total	**187,000**

Component 7: Monitoring, learning and evaluation

Output 7.1 Monitoring, learning, adaptive feedback and evaluation

99. The proposed initiative will allow changes during the implementation according to policy and market developments within the programme boundaries presented here. However, no additional financial resources will be made available to innovations and / or to address newly discovered barriers.

Activities:

- Development of the baseline and a monitoring and evaluation plan, including a revision of the indicators included in the Project Brief that will be used as part of the monitoring requirements for the Full Size Project (FSP);
- Annual audits and project final evaluation
- Dissemination of project results (reports, publications, workshops)
- Preparation of follow-up phase

The cost of component 6 is estimated at US$ 112,500 and divided as follows:

Source and type of funding	**US$**
GEF	112,500
Government in-kind funding	7,500
Total	**120,000**

2.3 Key indicators, risks and assumption (from the logical framework)

100. Key indicators of success for the Project include: (i) the existence of financial instruments available for longer-term support for wind energy; (ii) actual sales of green power (supported by marketing campaigns) from the Darling Wind Farm to progressive customers (at least in the Cape Town area); (iii) the existence of Tradable Renewable Energy Certificates; (iv) longer-term policy for wind energy (in the larger context of renewable energy) exists; (v) reports on wind resource assessments,

including 3-4 hot spots by the end of year 2 of the project and an updated wind resource map; (vi) pre-feasibility studies for 45 MW wind power by the end of the project; (vii) SAWEA is fully up and running by the end of year 1; (viii) engineers, consultants and others practitioners have been trained in operational aspects of wind energy development by the end of year 2 of the project followed by actual employment where use can be made of this newly acquired knowledge and skills.

101. Important project assumptions relate to: (i) baseline is not superseded or rendered obsolete because of large volumes of hydro-based electricity imported from neighboring countries; (ii) long-term financial support and proactive participation from the Government of South Africa and its institutions: Department of Minerals and Energy (DME); National Treasury (NT); Development Bank of Southern Africa (DBSA); Central Energy Fund (CEF); National Energy Regulator (NER); Department of Environment and Tourism (DEAT); cities and municipalities; (iii) existence of a sufficiently large green power market that can be successfully tapped into by a number of distribution companies; (iv) an interest from private investors to divert their investments to wind energy; (v) an interest from consultants, engineers and other practitioners to redirect their attention to wind power development; and (vi) sufficient available wind energy development hot spots that can be developed into commercial wind power projects. The assumptions mentioned here will be closely monitored and the project intervention strategy adapted accordingly.

102. Two categories of risks are to be taken into account; controllable risks within the proposed initiative's boundaries (internal risks) and risks that cannot be controlled by the proposed initiative, but can potentially affect the activities in a negative or positive manner. No major external risks exist in South Africa with regard to the proposed initiative. The internal risks are described in more detail below. Risk mitigation activities that have been designed and included in the proposed SAWEP initiative are also detailed in the Logical Framework analysis of Section II.

103. One group of risks relates to the presence of a green power market that is large enough to absorb substantial amounts of green power over a long period of time at green premiums that – in the case of wind – could be as high as twice the current unit price for power. Furthermore, green power, stemming from other cheaper renewable energy sources, might compete within a small market with expensive green wind power. This risk might materialize in a distant future when the supply of green power outstrips the demand. For the next 5-6 years such a scenario is extremely unlikely. Currently, the green power market is being estimated at 309 GWh per annum, which corresponds to a generation capacity of 123 MW. Extensive activities with regard to green power market surveys (where are the green power customers and how much are they willing to spent on green premiums; green power marketing (how do you reach your green power customers); and a green power guarantee scheme (how to reduce the risk of 'first generation' green power transactions) have been designed to properly address this risk. Furthermore, a TREC system will be set up for efficient and trustworthy green power operations and transactions. With regard to the green power guarantee scheme the risk of "lack of incentive for the Council of Cape Town (CCT) to promote the sales of green power" has been identified. This risk will be mitigated by the fact that the guarantee scheme will be in place for only 5 years whereas the PPA has a lifetime of 20 years. After the first 5 years CCT will not receive any funds from the guarantee scheme if they cannot sell on all the green power they are buying from the Darling IPP (Darlipp). This alone should be an incentive to build up a customer base even though a guarantee scheme is in place. A further mitigation measure will be

the inclusion of a reward scheme within the guarantee scheme, which would suggest a financial incentive to not use the guarantee scheme. Such a reward scheme will be discussed in the further negotiations of the guarantee scheme with CCT. In fact, CCT has shown a proactive attitude towards marketing the green power tariff. A marketing campaign has been designed and significant financial contributions from CCT have been secured (please refer to the co-financing letter).

104. Another group of risks relates to ensuring the involvement of private sector in actually realizing the investment in 45 MW of wind energy. It is anticipated however that if the incremental costs of wind power have been successfully addressed, there will be a sound basis for private sector involvement (see also Annex 2 in Section IV). Furthermore, this SAWEP initiative will propose a follow-up phase of activities to directly assist private investors entry into this new (and hence risky) wind power market; i.e. assistance with detailed engineering and financing plans; and assistance to get the financial community more actively involved in wind power development.

105. The third risk is the absence of replication after the first batch of 5.2 (project) + 45 MW (direct post-project) installed capacity targeted for the proposed initiative. This risk will be mitigated with by having appropriate financial and policy instruments for wind energy implementation put in place in, based on the long-term government policy on renewable energy, including activities such as nation-wide wind measurements, the creation of a wind map and wind training programmes. The institutional strengthening activities of SAWEP (such as supporting the wind association SAWEA) will strengthen the base needed for long-term wind energy developments.

In addition to the above listed activities to mitigate the identified risks, there will be permanent monitoring of risks and activities to mitigate these risks by the Project Management Unit (PMU) of SAWEP. Instead of following a 'cast-in-stone' project plan the project management team will adhere to the principle of 'Adaptive Management' to ensure that pitfalls in programme design, planning and implementation are immediately dealt with in the most appropriate manner. Although this is not specifically related to an identified risk, it does increase the implementation efficiency of the proposed activities.

2.4 Sustainability and replicability

Sustainability

106. By systematically addressing each of the barriers that currently impede the development of commercial wind power in South Africa, the proposed initiative will clear the path for a sustainable wind energy market. Project activities will strengthen the capabilities, awareness and support of key decision-makers so that a long-term implementation framework for wind energy development can be successfully designed and implemented.

107. It will furthermore develop national level training programmes, and develop a critical mass of support for project developers with the main focus on long-term incremental cost funding to be provided via combined green power sales and public sector support. The result will contribute to the consolidation of a coherent national programme for the promotion of commercial wind energy, with an articulated strategy backed by reliable data, a revised legal and regulatory framework, and a

strengthened commercial lending environment. UNDP will provide technical, financial and administrative backstopping to the entire process.

108. The Project will assist the DME to absorb gradually the role of the Project Management Unit (PMU) operations and staff developed for this Project and to formulate a follow-up programme in support of wind power development, so that, after 2 years, the activities of the PMU will become a business-as-usual operation of the DME.

109. Financial sustainability is enhanced through the project through two major interventions: (1) the design of a longer-term wind energy policy and implementation strategy with financial instruments that will assist in closing the current (and future) incremental costs of wind power generation, and (2) initiation of a long-term, well-structured green power market with reliable instruments such as green PPA's and Tradable Renewable Energy Certificates (TRECs) or a possible feed-in tariff. The overall market for Green Power over the next decade has the potential to grow substantially. The national market for electricity and the green power market projections are shown in Table 5. For Cape Town alone the green power market is estimated at 50.6 GWh (20 MW) with a market penetration level of 0.5%.

	Green Power market projections[15]	**National electricity market in SA [16]**
	GWh	**GWh**
Domestic	173.1	34623
Agriculture	0	4175
Mining	0	30947
Manufacturing	0	75521
Commercial	91.5	18301
Transport	0	5562
General	44.4	8887
Totals	**309**	**178017**

Table 4 **: National electricity market and green power market in South Africa**

The voluntary green power market as defined in Table 4 is seen as a starting point in supporting RETs in South Africa. The results of the market research support this view. However, it is understood that a substantial RE contribution to the energy mix cannot be based on voluntary green premium schemes alone. Therefore SAWEP makes provision for the development of Government supported financial instruments, such as feed-in tariffs

110. Although South Africa has a sophisticated and strong financial sector of commercial and development banks, these organisations are not used to dealing with renewable (high capital low operational cost) and small-scale (<100MW) power projects. Institutions such as the DBSA, the Central Energy Fund (CEF) and the Industrial Development Corporation (IDC) are the exception

[15] Agama, Green Funding Sources and mechanisms, 2004. The market penetration level is calculated at a conservative 0.5%. International experience over approximately a decade has shown that the voluntary markets for Green Power achieve up to 1% penetration of the overall electricity market without specific incentives.

[16] NER Electricity Supply Statistics for South Africa, 2001.

and are willing to lend to smaller projects. It is anticipated that these institutions will take the lead in involving other financial institutions in wind energy developments

Replicability

111. The technical potential for replication in South Africa is enormous (many thousands of MWs) as a result of a long coastline with average wind speeds of 6-7 m/s and power exceeding 200 W/m^2. Moderate wind power areas include the Eastern Highveld Plateau, Bushmenland and the Drakensberg foothills in the Eastern Cape and KwaZulu-Natal. However, the replication potential mainly depends on the successful setting up of a green power market and the viability of other long-term financial instruments. The activities proposed here will also have a positive impact on renewable energy development in general in South Africa. For example, a green power market will be to the benefit of all green power generation alternatives, not just wind power. Lastly, it is anticipated that replication of the experiences in South Africa will be disseminated into the SADC region, where also large (technical) potentials for wind energy exist. In Namibia for example, details on the design and setting up of wind farms have taken place and subsequent steps for realization are being proposed.

2.5 Stakeholder Analysis

112. Broad-based public consultations have been implemented as part of the PDF B activities during 2003 and 2004. This included personal interviews, advisory board meetings, Project Steering Committee meetings, dedicated meetings with the international consultancy consortium, culminating in a national wind energy workshop held at DBSA (on 25 March 2004). It attracted 50 delegates including a few international participants. Amongst the delegates were representatives from almost all of the stakeholders in the South Africa wind "industry", including the stakeholders involved in the PDF B project, the PSC members, Advisory Board members, consultants, Eskom, DBSA, CEF, SAWEA and project developers.. Much appreciation was expressed by the delegates with numerous requests for a follow-up workshops once the proposed SAWEP FSP would be approved.

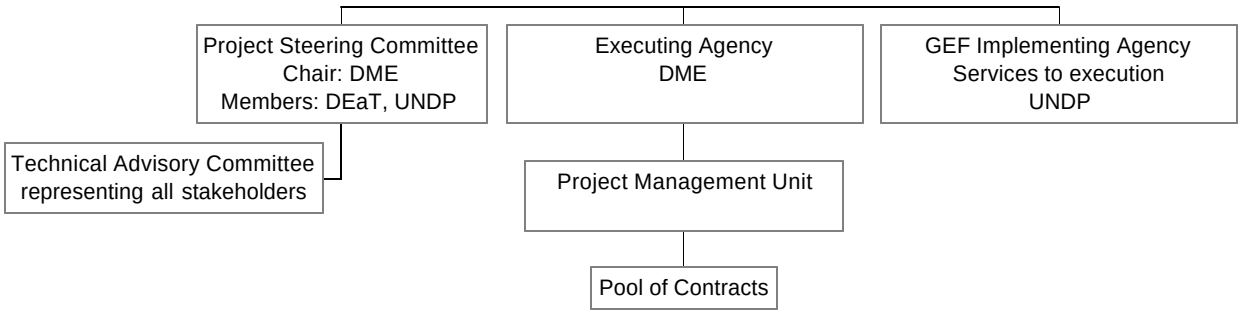
113. Furthermore, the combined cash and in-kind contribution of the South African Government (including cities and municipalities) is a very clear expression of interest for a project that is a combination of public-private investments. In this regard the proactive role of the City of Cape Town (CCT) needs to be highlighted. The CCT has not only committed itself to a City Energy Strategy but has also assumed significant financial risks by entering into a green PPA with the first Wind Energy Producer in South Africa.

PART III: Management arrangements

114. This project will be executed by the Department of Minerals and Energy (DME), following UNDP guidelines for nationally executed projects. UNDP will provide support services in the area of recruitment, procurement, financial and technical services and will be accountable to UNDP for the disbursement of funds and the achievement of the project goals, according to the approved work plan. In particular, the Executing Agency will be responsible for the following functions: (i) coordinating activities to ensure the delivery of agreed outcomes; (ii) certifying expenditures in line with approved budgets and work-plans; (iii) facilitating, monitoring and reporting on the procurement of inputs and delivery of outputs; (iv) coordinating interventions financed by GEF/ UNDP with other parallel interventions; (v) approval of Terms of Reference for consultants and tender documents for sub-contracted inputs; and (vi) reporting to UNDP on project delivery and impact.

115. A project management unit (PMU) will be created, which will possibly be located at DME's premises. The PMU will provide secretariat, coordination and overall management functions and tasks related to the different outputs. The PMU manager will report to the Director Renewable Energy of the DME and present progress reports to the Project Steering Committee (PSC). Furthermore the project manager will convene regular meetings between DME and UNDP, in order to monitor project progress and identify and resolve any bottlenecks and improve the quality of interventions. In these meetings, DME and UNDP review and authorize the financial and progress reports, as well as update work plans prepared by the project manager. In order to create transfer of capacity, the DME will assign some of its appropriately skilled personnel to the project management unit.

116. Project operational co-ordination and oversight will be provided by the Project Steering Committee (PSC), composed of DME, DEAT, and UNDP. The PSC will meet approximately 4 times a year with the objective of monitoring project progress, coordinating institutional roles and securing any information required for the project. The Chairman of the PSC (DME) will serve as the link to DME. During the first meeting of the PSC, the creation of a formal reporting/feedback arrangement will be proposed for the explicit provision of opportunities for a range of industry stakeholders to be involved in the project throughout the various stages of its implementation. This arrangement will have to guarantee full transparency at the national level. The PSC will establish an advisory board (technical advisory committee) that could function as a platform to present and share ideas as well



as to solicit specific inputs from its members that are envisaged to come from different sections within the wind project development community (Eskom, academic, finance, consulting engineers, NGO's and project developers/owners).

117. As the GEF implementing agency for this project, UNDP will monitor all activities and outputs. UNDP will ensure that the activities are being conducted in co-ordination with the government and other stakeholders. UNDP will be ultimately accountable to GEF for project delivery and responsible for supervising project implementation. UNDP will provide technical backstopping services and monitor adherence to the work plan. The project will comply with UNDP's monitoring, evaluation and reporting requirements, as spelled out in the UNDP Programming Manual. Quarterly progress reports will be submitted to UNDP by the executing agency, providing a brief summary of the status of activities and output delivery, explaining variances from the work plan, and presenting work-plans for each successive quarter for review and endorsement. The Quarterly progress reports will provide a basis for managing disbursements. An Annual Project Report (APR) will be prepared at the end of each year, summarizing and evaluating work in progress in more detail, and will be reviewed by the Project Steering Committee, which shall make recommendations to the executing agency and UNDP regarding the subsequent scheduling of project activities. A Terminal Report will be prepared upon project completion and reviewed at the final PSC meeting for the project. Part IV on Monitoring and Evaluation (in this Section I) outlines the reporting requirements further.

118. The UNDP is the GEF Implementing Agency for this project. The Country Cooperation Framework (CCF), within which UNDP plans and implements its development cooperation intervention, has currently been defined for 2002-2006. It includes 'environment and development' and 'local governance' as focal areas of attention. With respect to these areas, UNDP South Africa's objective is "to promote innovative legislation and action to protect the environment while contributing to the eradication of poverty in partnership with all levels of government, civil society and the private sector" and "poverty reduction by local governance.

119. A Memorandum of Understanding (MOU) between DME and UNDP regarding the roles and responsibilities of the two agencies in the execution of the project is attached. The MOU clarifies the services rendered by UNDP to the DME.–The Government will provide the Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP (including GEF) funds according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted by the legally recognized auditor of the Government, or by a commercial auditor engaged by the Government.

120. In order to accord proper acknowledgement to GEF for providing funding, a GEF logo should appear on all relevant GEF project publications, including among others, project hardware and vehicles purchased with GEF funds. Any citation on publications regarding projects funded by GEF should also accord proper acknowledgment to GEF. The UNDP logo should be more prominent - and separated a bit from the GEF logo if possible, as UN visibility is important for security purposes.

PART IV: Monitoring and evaluation

Monitoring

121. The project will be monitored and evaluated according to standard UNDP rules for nationally executed (NEX) projects. The PMU, under direct responsibility of the project coordinator, will elaborate and provide key monitoring and evaluation documentation. The PMU is responsible for continuous updating and reporting of financial and progress information. Specifically, a six-monthly review and reporting cycle will be established with the delivery of performance reports consisting of financial and progress reports, as well as proposals for updated work plans. The documentation will be subject to approval, potential adjustments and subsequent implementation in the regular meetings held between DME and UNDP. In those meetings, any bottlenecks occurring in implementation will be addressed and resolved. One of the initial activities in the work plan will specify appropriate performance benchmarks. These benchmarks will be established prior to project implementation, in order to enable effective monitoring of project progress, and to create a sound basis for informed crucial management decisions.

122. A detailed schedule of project reviews will be developed by the PMU, in consultation with project implementation partners during the early stages of project initiation, and incorporated in the Project Inception Report. Such a schedule will include methodologies and tentative time frames for Tripartite Reviews, Steering Committee Meetings, Monitoring and Evaluation of the Project as well as discussion on a possible follow-up 'technical assistance and investment' phase. The project will be subject to UNDP/GEF Monitoring and Evaluation rules and practices, including preparation of the Annual Project Report (APR).

123. The PMU will develop criteria for participatory monitoring of the project activities in consultation with the PSC. Appropriate participatory mechanism and methodology for performance monitoring and evaluation will be established at the very outset of the project. Monitoring and Evaluation activities will be based on the Logical Framework Matrix (as given in Section II). The overall Monitoring and Evaluation format for the project will follow the instructions and guidelines of the UNDP-GEF M&E Unit and will be laid out in detail at the Inception Workshop to be held within the first three months after project start-up.

124. UNDP will have the monitoring and reporting obligation for the full-size project. In this connection, additional monitoring and evaluation missions will be undertaken by UNDP/GEF as appropriate; for example when there is a need for an intermediate assessment of progress or impact before a decision is taken as to the continuation of any given activity. In addition, use will be made of the UNDP experience in monitoring full-size projects to ensure that the UNDP/GEF coordinating units in Pretoria and in New York properly monitor the activities. The project planning matrix includes monitoring indicators, as indicated in Annex 1.

Review

125. Annual review meetings involving key stakeholders will be held to review the status of implementation of the programme. The purpose of the review meetings is to assess the progress made

and to make decisions on recommendations to improve the design and implementation of the programme in order to achieve the expected outputs. The annual review is to be based on the APR.

126. In accordance with GEF requirements, progress reports will also be provided during the course of the Project to both UNDP-South Africa and the UNDP-GEF Regional Coordinating Unit (RCU) for Southern and Eastern Africa – also based in South Africa. Monitoring and Evaluation indicators will be built into the project in consultation with UNDP/GEF.

UNDP Evaluation

127. The full-size project will be subject to an Evaluation Plan in accordance with the policies and procedures established by UNDP and GEF, as well as to internal technical and administrative controls established by the Government of South Africa (through DME). The Evaluation Plan – including timing of evaluations – will be agreed on between DME and UNDP and with the regional UNDP/GEF Coordinating Unit in South Africa. With respect to the evaluations, the plan to be designed will determine the evaluation periods and subjects.

128. One external evaluation will be carried out towards the end of the project. This final evaluation will assist the project stakeholders to evaluate the results and impacts of the project and to draw lessons learned for use in improving the quality of future development interventions with similar activities. In addition, the evaluation will assess if the conditions have been met to enter into a possible follow-up phase (the former 'phase 2' of the original SAWEP project concept).

GEF Evaluation

129. The impact of the proposed initiative in terms of emission reductions is of immediate interest for the GEF as this is their main mandate. Associated impacts such as improved conditions for wind power generation (mainly replication), diversification of the electricity mix, increased employment and reduced fossil fuel use are considered important as well, since they contribute to the sustainability of the proposed initiative and hence the (continued) reduction of emissions of CO_2. In order to properly and practically monitor these impacts it will be necessary that baselines will be established prior to the implementation of the project. Furthermore, it will be necessary to identify a number of (easily) measurable indicators that can be used for monitoring the impacts. The impact monitoring should be done on an annual basis by the project implementation team and the data collected and analysed should serve as a management tool for the team to steer and/or re-direct the project's implementation. It is proposed that at minimum the following indicators (including the indicated means of verification) will be used:

Impact to be monitored	Indicators to be used	Means of verification
CO_2 emission reduction	Electricity delivered to the grid	Power Purchase Agreements Accounting books from the commercial electricity agents
Improved legal/regulatory framework for intermittent power generation (such as wind)	Number and volume of prospected and actual wind power investments, as well as other intermittent power projects (hydro run-off river)	Licenses at NERSA Power Purchase Agreements Accounting books from the commercial electricity agents
Increased involvement of the financial community in wind power lending	Number and volume of prospected and actual oans for renewable and wind energy projects Number of financial institutions involved	Market survey within the financial community Accounting books and annual financial reports from the wind power generation companies

130. Please note that the baseline methodologies and monitoring and evaluation plans for grid-connected projects (in particular wind) that will become available as part of the Clean Development Mechanism (CDM) project development cycle (in South Africa and outside) could be used to further fine-tune the results and impact monitoring scheme (as given in the logical framework of Section II and in the above table).

131. In addition to the GEF specific monitoring as described above specific GEF technical assistance will be provided to the PMU as to ensure that the project implementation will make the best possible use of existing experiences gained throughout the years of GEF operations (e.g. GEF 'wind power' projects in Costa Rica, Tunisia and Mexico). Moreover it will assist with ensuring that the GEF project implementation requirements, as they are frequently put forward by the GEF Secretariat, will be incorporated at the project's operational level.

132. An amount of USD 112,500 from GEF has been earmarked tentatively for overall monitoring activities and evaluations throughout the implementation of the full-size project.

PART V: Legal context

133. This programme document shall be the instrument referred to as such in Article 1 of the Standard Basic Assistance Agreement between the Government of South Africa and the UNDP. The host country executing agency shall, for the purpose of the Standard Basic Assistance Agreement, refer to the Government co-operating agency described in that Agreement. As support to the executing agency, the UNDP country office will provide support services for some of the activities of the project as identified and agreed upon by all parties, especially in the following areas:

- Identification and recruitment of personnel/experts to undertake specific activities under the project;
- Identification and facilitation of training services; and
- Procurement of goods and services.

134. The country office will be provided a lump sum budget directly from UNDP/GEF headquarters in New York for the provision of all the identified and agreed upon services. This lump sum budget will be negotiated separately between UNDP/GEF headquarters and UNDP South Africa.

135. The following types of revisions may be made to this Project Document with the signature of the UNDP Resident Representative of the country office only, provided that he/she is assured that the other signatories of the project document have no objection to the proposed changes:

- Revisions in, or in addition to, any of the annexes of the project document;
- Revisions which do not involve significant changes in the immediate outcomes, outputs or activities of the programme, but are caused by the re-arrangement of inputs already agreed upon or by cost increases due to inflation; and
- Mandatory annual revisions, which re-phase the delivery of agreed programme inputs, or reflect increased expenditure or other costs due to inflation or take into account agency expenditure flexibility.

Section II: Strategic Results Framework and GEF Increment

PART I: Incremental cost analysis

BROAD DEVELOPMENT GOALS

A number of combined issues constitute the national development objective, i.e.: to diversify power generation in South Africa's energy mix; to set up a wind energy industry that could generate employment and could export to the SADC region; and to promote sustainable development by making use of the nation's renewable, natural resources (such as wind).

GLOBAL ENVIRONMENTAL OBJECTIVE

The global environment objective is to reduce greenhouse gas emissions generated by thermal power generation in the national inter-connected system. The strategic goal is to install and operate up to 5.2 MW Darling wind farm and prepare the development of wind farms with a combined capacity of.45 MW.

BASELINE

The business-as-usual scenario for meeting South Africa's increasing electricity demand favours increased investment in thermal power plants, with (clean) coal and natural gas, and to a lesser extent, increased imports of large-scale hydro power. Combined with the need for the anticipated annual 1,000 MW generation capacity over the period 2007-2016, this would result in an important increase of GHG emissions from the electricity sector. On the other hand, given the existing financial, policy, regulatory, institutional, information and specific wind energy development capacity constraints as well as high economic costs, it cannot be reasonably expected that South Africa would implement wind power without any short-term (donor-based) and long-term (Government-based) financial assistance.

GEF PROJECT ALTERNATIVE

To remove and/or reduce this financial barrier the donor-community (including UNDP/GEF) can provide financial assistance for the short-term (2-5 years) together with long-term (financial) support made available by the South African Government. The South African Government is committed to wind energy as the renewable energy technology with the highest potential in the longer run (after 2013).

The proposed 2-year UNDP/GEF SAWEP initiative seeks to make available 'technical assistance' to the South African Government in terms of policy making and the development of the most appropriate financial instruments for policy implementation. At the end of the initiative, this will have created a solid basis for the Government to take a decision on the longer-term support for wind energy, including the policy and implementation strategies to be followed.

The project has been divided into six components to contribute to the lowering of the identified barriers over a 2-year period. By successfully implementing activities under these six components the project will contribute towards the achievement of the global and development objectives:

- *Increased public sector incremental cost funding*, by assisting the Government of South Africa with detailing the most appropriate financial instruments that should be made available to stimulate commercial wind energy developments;

- *Green power funding initialised,* by assisting initiatives geared towards green power marketing and setting up and implementing Tradable Renewable Energy Certificates (TRECs) as well as implementing a green power guarantee scheme developed under the PDF B;
- *Long-term policy and implementation framework for wind energy developed,* by assisting the Government of South Africa;
- *Wind resource assessment,* by assisting interested public and private sectors entities with the generation of reliable wind energy data and other necessary information for wind energy development;
- *Commercial wind energy development promoted,* by assisting private sector developers with the (pre-) feasibility of a number of wind farms up to 45 MW installed capacity.
- *Built capacity building and strengthened institutions,* such as key government departments (e.g. national and provincial environmental departments), public agencies (e.g. financing), wind farm industry (e.g. South African Wind Energy Association) and independent private firms involved in wind energy development.

SYSTEM BOUNDARY

The geographical boundary of the proposed SAWEP full-size project (FSP) is the national territory of South Africa. Several potential geographic areas have been pre-identified where very preliminary wind measurements and back-of-the-envelop studies have ascertained a technical wind energy potential of around thousands of MW. Much more detailed data will be gathered during the FSP execution in order to complement the information generated during the PDF-B phase.

From a technological perspective, it is anticipated that the technical assistance activities of SAWEP create a first basis for the development of about 4 wind farms (with a capacity of 45 MW) to be installed over the period up to 2009-2010 and for any future wind farm developments beyond.

ADDITIONAL BENEFITS

Wind-power projects contribute to increased foreign investment; mobilize commercial bank participation in the renewable energy arena; reduce dependence on fossil fuels (coal); improve the country's energy balance/mix; contribute to economic development activities in often remote areas and lastly they generate employment benefits. With regard to the latter, for the case of South Africa the possibilities for local assembly and partial manufacturing in combination with extending wind energy activities into the SADC region (in particular Namibia) will substantially increase these employment benefits.

COSTS

The total cost of the GEF-supported alternative is US$ 10.38 million of which US$ 2 million of GEF funds have been earmarked to address the policy/regulatory, institutional capacity, financial and informational barriers to wind energy development in South Africa. This is in addition to US$ 295,000 that has been allocated for the PDF-B activities. Co-financing cash contributions of US$ 8.18 million will come from the City of Cape Town, DBSA, national government as well the funding provided by the Darling IPP and DANIDA. In-kind contributions will come from the various Government entities (DBSA, DME, DEAT, NER, CSIR, REDs, etc.) and will amount to US$ 200,000.

GLOBAL BENEFITS

The project is designed with a strong focus on deriving lessons learned from the investment in the Darling Phase 1. The installation and operation of the 5.2 MW Darling wind farm will *directly* avoid the greenhouse gas emissions that would otherwise be generated by thermal power generation in the national inter-connected system, resulting in an annual reduction of approximately 10,946 tonnes of CO_2 equivalent (tCO_2). In addition, the likely *post-project* investments in 45 MW of wind power (for which feasibility studies will be supported during the implementation of the SAWEP FSP) will result in 94,725 tCO_2. Thus over the 20-year lifetime of the wind farms (50.2 MW), a total of 20 x 105,671 = 1.9 million tCO_2 equivalent will be reduced as a **direct and direct post-project** impact of the here proposed initiative.

Indirect emission reductions, associated with the barrier removal activities of the proposed SAWEP initiative have been estimated as another 2.5 million tCO_2 (see annex 1 in Section IV). Thus the total anticipated emissions reductions are 4.6 million tCO_2 (over the assumed 20-year lifetime of a wind farm).

INCREMENTAL COST MATRIX

COMPONENT	BASIC REFERENCE SITUATION (B)	ALTERNATIVE (A)	INCREMENT (A-B)
1. Public sector incremental funding set up	The current momentum created around wind energy (Darling wind farm, PDF B activities) will be lost and the basis for wind energy development at a later stage (after 2010) will be non-existing No appropriate longer-term financial instruments specific for wind energy will be developed in the short term	With active Government intervention (financial support) in combination with the proposed GEF activities, wind energy development activities will get a boost Financial instrument specific for fostering longer-term wind energy developments will be prepared	Carried on momentum for wind energy developments In addition to short-term capital (such as CEF's US$ 2 million for the Darling project, see component 5), longer-term financial mechanisms for wind energy development are in existence
	Baseline financing: $ 45,000	**$ 155,000**	**GEF: $ 110,000**
2. Green power funding initialised	No or few attempts with regard to setting up and implementing green power market instruments (green PPA's, TREC's) will be undertaken	Following the Cape Town example, coordinated activities with regard to green power market surveys, green power marketing and setting up of a well coordinated systems for Tradable Renewable Energy Certificates (TRECs) will be undertaken as part of the proposed initiative	An overview of the volume and geographical spread of the green power market will be available to be used for green power marketing. A TREC system will be designed and pilot tested for Cape Town
	Without proper guarantee mechanisms in place for green power sales, there will be little interest and subsequent actions from distribution companies to enter into the first steps of green power supply to progressive electricity consumers	Appropriate guarantees are provided to distribution companies, so they will take the lead in buying green power that will be supplied to progressive customers in their distribution areas	A guarantee scheme specific for the Cape Town onward sales of green power from the 5.2 MW Darling wind farm will be made available
	Baseline financing: $ 605,000	**$ 1,245,000**	**GEF: $ 640,000**
3. LT policy and implementation framework for wind energy developed	An implementation strategy for renewable energy will be prepared as part of reaching the 10,000 GWh renewable energy target by 2013, but wind energy will hardly be included in there	Wind energy will be included in the implementation strategy with the aim to install up to 45 MW over the period 2007-2013	A renewable energy implementation strategy that includes wind energy that will contribute up to 45 MW for the necessary annual 10,000 GWh renewable energy power generation by 2013

COMPONENT	BASIC REFERENCE SITUATION (B)	ALTERNATIVE (A)	INCREMENT (A-B)
	A longer-term policy for wind energy; i.e. beyond 2013 will not be prepared	Within the context of preparing a longer-term policy for renewable energy, wind energy will be included and highlighted as THE renewable energy technology that makes 'commercial' sense in the longer term when large volumes of renewable energy have to be generated	A policy basis for continued wind power development; i.e. after 2013 has been prepared, which in combination with the longer-term financial instruments (see component 1) is anticipated to be a strong basis for future wind energy investments
	Baseline financing: $ 45,000	**$ 145,000**	**GEF: $ 100,000**
4. Wind resource assessment	No further wind resource assessments will take place in South Africa over the next 2-3 years	Wind resource assessments will systematically take place and data will be analysed, interpreted and presented in a manner accessible for the wind energy community (including policy makers and financiers)	Publicly available wind resource information on 20 sites including a number of identified hot spots
	Wind resource data will not be publicly available, nor will the national wind resource map be updated	Detailed wind measurements will take place for identified hot spots	Good quality wind resource information on a small number of sites that can be used for detailed feasibility studies for the development of 3-4 wind farms totalling up to 45 MW
		The current wind resource map for South Africa will be updated making use of the information collected during above mentioned wind resource assessments	An updated national wind resource map
	Baseline financing: $ 45,000	**$ 355,000**	**GEF: $ 310,000**
5. Commercial wind energy development promoted	Apart from the Darling Wind Farm, Phase 1, no studies at feasibility level will be undertaken over 2000-2009 and so little investment in wind will take place until 2013 (apart from Darling)	Detailed (pre-)feasibility studies will be developed attracting possible investors for 3-4 wind farms	Full set of detailed, good quality information necessary serving as base date for (post-project) detailed engineering and financial analysis (for up to 45 MW)
	Baseline financing (Darling Wind Farm): $ 9,504,000	**$ 9,804,000**	**GEF: $ 300,000**
6. Built capacity and strengthened institutions	Specific wind energy training and capacity building would be at very low levels	Training programmes specific to wind energy (design, construction, grid-connection, operation and maintenance) will be designed and implemented. Also awareness and basic training on wind energy development for the financial community will be developed and implemented	Trained local consultants and engineers that could be involved in wind energy developments of the first generation projects (and beyond). Increased awareness and some basic knowledge on wind energy developments with the financial community

COMPONENT	BASIC REFERENCE SITUATION (B)	ALTERNATIVE (A)	INCREMENT (A-B)
	SAWEA would struggle for its survival over the short and medium term in the absence of actual wind energy developments, which are the justification for its existence as well as the source of financial resources for SAWEA's medium to longer-term operations	SAWEA will be actively supported in terms of detailing their business plan, work plan and financing thereof for a period of 3-5 years, after which it should be financially self-sustainable	A solid SAWEA has been set up with sound financial perspectives for the future
	No lessons learned will be generated that are worthwhile disseminating	Activities of the entire programme will be closely monitored and information will be collected to a) steer the programme's implementation and b) to provide lessons learned to a wider audience	Increased (general) awareness and understanding on the practical and financial aspects of wind energy developments in South Africa
	Baseline financing: $ 7,500	**$ 187,000**	**GEF: $ 179,500**
7. Monitoring, learning and evaluation	There is no project tool available that allows monitoring and final evaluation of project outputs and performance as well as of its global environmental and other impacts	Information and knowledge obtained from monitoring and evaluation has been captured and disseminated	Fine-tuning and implementation of a methodological framework for measuring baseline and end-of-project indicators of project achievements and project impacts
	Baseline financing: $ 7,500	**$ 120,.000**	**GEF: $ 112,500**
Project management	**Baseline financing: $ 80,000**	**$ 328,0000**	**GEF: $ 248,000**
Global Environmental Benefits	CO_2 emissions increase along with the increased electricity demand	Within 15 years, an anticipated 200 MW (of which 5.2 MW as a direct and an additional 45 MW as direct post-project result of the proposed initiative) of electricity will be supplied by wind power, and there will be corresponding reduction in GHG emissions.	Approximately 4.6 million tons of CO_2 reduced over a 25-year period as the combined direct, direct post-project and indirect effects of the proposed initiative
Local Benefits	There will be no or at best very limited development of wind-power generation in South Africa	Within 10-15 years, South Africa will have a flourishing wind energy industry, with anticipated spin-off effects into the SADC	Strong basis for wind energy development as a result of a combination of increased skills, knowledge and experience; policy environment; financial instruments to assist wind energy investments with jobs created; new investments into non-traditional, remote areas
COSTS	***Baseline financing: $ 10,339,000***	***$ 12,339,000***	***GEF: $ 2,000,000***

PART II: Logical Framework Analysis

I. GOAL and OBJECTIVE			
Strategy	***Objectively Verifiable Indicators (OVI)***	***Means of Verification (MoV)***	***Critical Assumptions and Risks***
Goal: To reduce GHG emissions generated by thermal power in the national inter-connected system.			
Objective: To install and operate up to 5.2 MW Darling wind farm and prepare the development of 45 MW combined wind farms (by the private sector)	Wind power capacity to be installed reaches at least 5.2 MW (2008), 50.2 MW (2013) and 150 MW (2020); wind power output and sales of at least 362,010 GWh/year at the end of year 2020 Direct annual reduction of 11,000 tCO_2 per year (due to installation of 5.2 MW Darling IPP), direct post-project reduction of 95,000 tCO_2 annually (linked with installation of an additional 45 MW of wind power, for which feasibility analysis has been supported by SAWEP) and an additional 126,000 tCO_2 reduction (due to installation of 100 MW wind power as indirect impact in the longer run of the project). Total: 232,000 tCO_2 annually and 4.6 million tCO_2 (assuming a 20-year lifetime)	Project M&E reports Power Purchase Agreements Official publications from NER, DME, DBSA, CEF, NT, DEAT Annual reports from NER on electricity production Accounting books of commercial electricity agents Monitoring and evaluation report on avoided GHG emissions with respect to baseline	Baseline is not superseded or rendered obsolete because of renewable energy based electricity imported from e.g. neighbouring countries or in-country generation Support from the Government of South Africa and its institutions: DME, CEF, DBSA, NER, DEAT and NT throughout the project life

II. Outcomes

1. *Public sector incremental cost funding set up*, by assisting the Government of South Africa with detailing the most appropriate financial instruments that should be made available to stimulate commercial wind energy developments.	- Financial instruments (other than voluntary green premiums) have emerged, such as feed-in tariffs, government capital investment grants, ODA mixed credit schemes	- Official documents from DME, NER and NT - PMU reports, UNDP/GEF annual reports and monitoring reports - Publications in newspapers	- Active and participating role of DME during the preparation of appropriate financial instruments - There is sufficient volume of green power consumers that are willing to absorb green premiums of 17 Rcts/kWh for 45 MW wind power; i.e. 118,733 MWh/year
2. *Green power funding initialised*, by assisting initiatives geared towards green power marketing and setting up and implementing Tradable Renewable Energy Certificates as well as implementing a green power guarantee scheme developed under the PDF B.	- At least 1 Green PPA's has been signed (other than for Darling Wind Farm) - TRECs are in existence and have been tested for Darling Wind Fam - Progressive electricity consumers buying 100% of green power produced by wind parks to a premium price - Green power guarantee scheme is operational in Cape Town	- Official documents from NER - Physical evidence of TRECs - TV, Radio, internet and printed media that are actively marketing green power - Electricity bills and annual reports of distribution companies - PMU reports, UNDP/GEF annual reports and monitoring reports	- Municipalities and distribution companies will actively market green power making use of their internal budgets
3. *Long-term policy and implementation framework for wind energy developed*, by assisting the Government of South	- Implementation strategy (including allocation of funding) of the White Paper on Renewable Energy in which wind energy is appropriately integrated - Public funds are available to at least support (capital subsidy) the establishment of 45 MW in the medium term	- White paper on Renewable Energy and official papers from DME regarding the implementation of renewables, in particular wind - PMU reports, UNDP/GEF annual reports and monitoring reports	- Long-term perspective of Government in terms of renewable energy development; i.e. beyond the 2013, 10,000 GWh/year target
4. *Wind resource assessment*, by assisting interested public and private entities with the generation of reliable wind energy data and other necessary information for wind energy development.	- Updated national wind resource map available by the end of project - Hot spots for wind energy development identified and publicly available - Detailed wind measurement reports available as a result of (private-sector-led) wind measurements at identified hot spots	- Publicly available national wind resource map and reports on hot spots - Detailed wind measurement reports (owned by private developers)	- Interested private sector developers that will co-invest in detailed wind measurements at identified hot spots - A good wind climate at identified spots does exist

Strategy	*Objectively Verifiable Indicators (OVI)*	*Means of Verification (MoV)*	*Critical Assumptions and Risks*
II. Outcomes			
5. *Commercial wind energy development promoted*, by assisting private sector developers with the (pre-) feasibility of a number of wind farms up to 45 MW installed capacity.	- Up to a maximum of six private wind energy developers have been assisted with their (pre-) feasibility study	- Project feasibility reports	- Interested private sector developers that will co-invest in project preparation at identified hot spots
6. *Built capacity building and strengthened institutions*, such as support key government departments (e.g. national and provincial environmental departments), public agencies (e.g. financing), wind farm industry (e.g. South African Wind Energy Association) and independent private firms involved in wind energy development	- SAWEA is up and running - Number of training workshops organized and number of participants involved in these over 2 years - Number of consultants and engineers that are employed for wind energy development	- Statutes of SAWEA, minutes of meetings, newsletters, operational website, etc. - PMU reports, UNDP/GEF annual reports and monitoring reports	- Interest from individuals to provide voluntary inputs for SAWEA for the initial 1-2 years - Interest of the consulting and engineering society to divert its operations to wind power development
7. Monitoring, learning, feedback and evaluation	- Methodological framework of output and impact indicators is available - Number of project technical reports and publications and information dissemination events	- PMU reports, UNDP/GEF annual reports and monitoring reports; project technical reports and publications	- Logical framework is properly and adequately designed

Strategy	*Objectively Verifiable Indicators*	*Means of verification (MoV)*	*Critical Assumptions and Risks*
III. OUTPUTS			
1.1 Detailed financial instruments to stimulate commercial wind energy developments have been designed and accepted for implementation by the Government	Appropriate financial instruments available for continued wind energy developments at the end of year 2 of the project	- Official documents from DME, NER, and the NT - Official publications in the official newspaper - PMU reports, UNDP/GEF annual reports and monitoring reports	- Active and participating role of DME during the preparation of appropriate financial instruments
2.1 Green power guarantee scheme designed under the PDF B has been fine-tuned and is under implementation in the City of Cape Town	- A guarantee scheme, including GEF funding of up to US$ 560,000 has been set up with a financial institution and is earmarked for guaranteeing green power sales from the Darling 5.2 MW wind farm. This has been accomplished within the first six months after the project commenced - Green PPA's have been signed by end of the project - First green power unit from the Darling Wind Farm to be generated and delivered to the City of Cape Town, within twelve months after the UNDP/GEF programme has commenced; i.e. the signature date of the project document; - An uptake of at least 50% of the green power generated by the Darling Wind Farm by (progressive) green power customers in the City of Cape Town distribution area	- PMU reports, including monitoring reports specific on the guarantee scheme - Documentation from the NER - Electricity bills and annual reports from power utilities	- Financial institutions interested to host this relatively small guarantee scheme - There is sufficient volume of green power consumers that are willing to absorb green premiums of 17 Rcts/kWh for 45 MW wind power; i.e. 118,733 MWh/year -
2.2 Green power marketing activities for selected urban centres are designed and actively supported by UNDP/GEF	- Marketing campaigns via radio, TV, internet and the printed media - Informed electricity customers on green power and the possibilities for signingup for green power contracts	- Consumer surveys as part of monitoring the marketing campaigns	- Municipalities and distribution companies will actively market green power making use of their internal budgets
2.3 A system for Tradable Renewable Energy Certificates (TREC) has been designed, set-up and is under implementation	- TRECs are in existence and have been tested in Cape Town (associated with the Darling wind farm)	- Physical evidence of TREC's (certificates) - Reports from the TREC-administrative body (NER?)	

Strategy	*Objectively Verifiable Indicators*	*Means of verification (MoV)*	*Critical Assumptions and Risks*
III. OUTPUTS			
3.1 A long-term policy for wind energy, including an implementation strategy and policy (financial) instruments has been designed and accepted by the Government for inclusion into their overall renewable energy policy and implementation strategy	- Implementation strategy (including allocation of funding) of the White Paper on Renewable Energy (in which wind energy is appropriately integrated) exists	- White paper on renewable energy and official papers from DME - PMU reports, UNDP/GEF annual reports and monitoring reports	- Long-term perspective of Government in terms of renewable energy development; i.e. beyond the 10,000 GWh/year target by the year 2013
4.1 Wind measurements and monitoring at 20 sites has been undertaken and an update wind energy potential estimate and an updated wind map have been produced	- An updated wind resource map has been produced before the end of the project, with useful intermediate results indicating 8-12 wind energy development hot spots at the end of year 2 of the project	- Publicly available national wind resource data in the form of a map and reports on hot spots	- Interested private sector developers that will co-invest in detailed wind measurements at identified hot spots
4.2 A maximum of10 private developers have been assisted with their wind measurements for sites identified for commercial wind farm developments with up to 45 MW installed capacity	- Detailed wind measurement reports available as a result of private sector led wind measurements at identified hot spots latest by the end of year 2 of the project	- Detailed wind measurement reports owned by private developers, so access to that information will be limited	
5.1 Private developers have been assisted at a pre-feasibility level with project development activities for wind power development up to 45 MW	- Pre-feasibility reports have been prepared for up to 6 wind farms latest by the end of year 2 of the project	- Pre-feasibility report (if accessible)	- Interested private sector developers that will co-invest in project development at identified hot spots - Identified hot spots can be turned into commercial wind power operations

Strategy	*Objectively Verifiable Indicators*	*Means of verification (MoV)*	*Critical Assumptions and Risks*
III. OUTPUTS			
6.1 The technical capacity of the main actors involved in wind power generation has been strengthened	- Number of participants that have successfully followed training programmes in the 2 years - Number of consultants and engineers that are employed for wind energy developments after 2 years	- PMU reports	- Interest of the consulting and engineering society to divert its operations to wind power development
6.2 The South African institutional capacity of the key institutions involved in renewable energy (power) development has increased	- Number of people trained from key (public) institutions capacitated in wind energy development in 5 years	- PMU reports	
6.3 The South African Wind Energy Association (SAWEA) has been strengthened and institutionalized	- SAWEA up andrunning by end of phase 2	- Statutes of SAWEA, minutes of meetings, newsletters, operational website, etc.	- Interest from individuals to provide voluntary inputs for SAWEA for the initial 1-2 years
6.4 Lessons learned from experiences in South Africa have been distilled and disseminated to a larger audience; a follow-up phase has been formulated	- Number of knowledge sharing workshops that will be organized and the number of participants at these workshops	- Workshop proceedings - Project publications and reports	
7.1 Monitoring, learning, feedback and evaluation	- Methodological framework of output and impact indicators is available - Number of project technical reports and publications and information dissemination events - Formulation of a follow-up phase of 'technical assistance and investment' to further promote the development of wind power in South Africa	- PMU reports, UNDP/GEF annual reports and monitoring reports; project technical reports and publications - Baseline and end-of-project study	- Logical framework is properly and adequately designed

Section IIII: Total Budget and Work Plan

Award ID:	**45717**
Award Title:	**PIMS 1637 South Africa Wind Energy Programme (SAWEP)**
Project Title:	**Technical Assista**
Executing Agency:	**UNDP**

GEF Outcome / Atlas Activity	Responsible Party (Implementing Agent)	Fund ID	Donor name	Atlas Budgetary Account Code	ERP/ATLAS Budget Description/Input	Amount (USD) Year 1	Amount (USD) Year 2	Total (USD)
Outcome 1 Public sector incremental cost funding		62000	GEF	71300	Local Consultants	42,500	50,500	93,000
				71600	Travel	6,200	3,800	10,000
				72500	Supplies	500	500	1,000
				74200	Reporting cost	500	500	1,000
				74500	Miscellaneous Expenses	2,500	2,500	5,000
					sub-total outcome 1	**52,200**	**57,800**	**110,000**
Outcome 2 Green Power funding	UNDP	62000	GEF	71200	International Consultants	20,000	9,000	29,000
				71300	Local Consultants	5,000	30,000	35,000
				71600	Travel	3,000	7,000	10,000
				72600	Grants	250,000	310,000	560,000
				74200	Reporting cost	500	500	1,000
				74500	Miscellaneous Expenses	2,500	2,500	5,000
					sub-total outcome 2	**281,000**	**359,000**	**640,000**
Outcome 3 Long-term policy and implementation framework for wind energy	UNDP	62000	GEF	71200	International Consultants	20,000	20,000	40,000
				71300	Local Consultants	20,000	20,000	40,000
				71600	Travel	6,000	7,000	13,000
				72500	Supplies	500	500	1,000
				74200	Reporting costs	500	500	1,000
				74500	Miscellaneous Expenses	2500	2,500	5,000
					sub-total outcome 3	**49,500**	**50,500**	**100,000**
Outcome 4 Wind resource assessment	UNDP	62000	GEF	71200	International Consultants	100,000	40,000	140,000
				71300	Local Consultants	55,000	60,000	115,000
				71600	Travel	30,000	17,000	47,000
				74200	Reporting costs	1,000	1,000	2,000
				74500	Miscellaneous Expenses	2,500	3,500	6,000
					sub-total outcome 4	**188,500**	**121,500**	**310,000**
Outcome 5 Commercial wind energy development	UNDP	62000	GEF	71200	International Consultants	40,000	110,000	150,000
				71300	Local Consultants	35,000	85,000	120,000
				71600	Travel	10,000	11,500	21,500
				72500	Supplies	1,000	1,500	2,500
				74200	Reporting costs	500	500	1,000
				74500	Miscellaneous Expenses	2,500	2,500	5,000
					sub-total outcome 5	**89,000**	**211,000**	**300,000**
Outcome 6 Capacity building and institutional strengthening	UNDP	62000	GEF	71200	International Consultants	20,000	70,000	90,000
				71300	Local Consultants	20,000	50,000	70,000
				71600	Travel	5,000	7,000	12,000
				74200	Reporting costs	1,250	1,250	2,500
				74500	Miscellaneous Expenses	2,500	2,500	5,000
					sub-total outcome 6	**48,750**	**130,750**	**179,500**
Outcome 7 Monitoring, learning and evaluation	UNDP	62000	GEF	71200	International Consultants	0	12,500	12,500
				71300	Local Consultants	30,000	40,000	70,000
				71600	Travel	5,000	10,000	15,000
				74100	Professional services	2,500	2,500	5,000
				74200	Reporting costs	1,000	4,000	5,000
				74500	Miscellaneous Expenses	2,500	2,500	5,000
					sub-total outcome 7	**41,000**	**71,500**	**112,500**
Project Management Unit	UNDP	62000	GEF	71300	Local Consultants	90,000	114,000	204,000
				71600	Travel	8,000	12,000	20,000
				72200	Equipment and furniture	5,000	2,500	7,500
				72500	Supplies	1,250	1,250	2,500
				74100	Professional services	2,000	2,000	4,000
				74200	Reporting cost	2,500	2,500	5,000
				74500	Miscellaneous Expenses	2,500	2,500	5,000
					sub-total PM	**111,250**	**136,750**	**248,000**
					TOTAL	**861,200**	**1,138,800**	**2,000,000**

OUTPUTS AND ACTIVITIES	PHASE 1																							
	YEAR 1 (months)												YEAR 2 (months)											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
OUTCOME 1 **PUBLIC SECTOR INCREMENTAL FUNDING SET UP**																								
1.1 Financial instruments for wind energy																								
1.1.1 Detailed assessment of public sector instruments																								
1.1.2 Revision and design of financial instruments																								
1.1.3 Initiating and monitoring the formal approval of instruments																								
COMPONENT 2 **GREEN POWER FUNDING INITIALISED**																								
2.1 Green power guarantee scheme implemented, Cape Town																								
2.1.1 Fine-tuning of the Scheme designed under PDF B																								
2.1.2 Implementation of the Scheme in Cape Town																								
2.1.3 Monitoring and evaluation of the scheme																								
2.2.4 Discussion on similar schemes with other cities																								
2.2 Green Power marketing activities in selected cities																								
2.2.1 Implementation of marketing green power in CT To																								
2.2.2 Marketing activities designed and implemented in Jo'burg																								
2.2.3 Monitor the marketing activities in CT and Jo'burg																								
2.3 Tradable Renewable Energy Certificates (TREC) system																								
2.3.1 Nation-wide green power survey carried out																								
2.3.2 Design and setting up of TREC system in S. Africa																								
2.3.3 Apply Cape Town TREC to 5.2 MW Darling project																								
OUTCOME 3: **LT WIND ENERGY POLICY AND FRAMEWORK DEVELOPED**																								
3.1 LT policy ands implementation strategy for wind energy																								

OUTPUTS AND ACTIVITIES	PHASE 1																							
	YEAR 1 (months)												YEAR 2 (months)											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
3.1.1 Detailed assessment of policy instruments																								
3.1.2 Recommendations to include wind in RE policy frame																								
OUTCOME 4: WIND RESOURCE ASSESSMENT																								
4.1 Wind measurements and monitoring to update wind map																								
4.1.1 Development of national wind farm criteria/guidelines																								
4.1.2 Wind measurements at 8-10 sites during a 1-yr period																								
4.1.3 Updating wind map																								
4.2 Assist private sector with 45 MW wind farm development																								
4.2.1 Assist 6-10 developers with their wind measurements																								
OUTCOME 5: COMMERCIAL WIND ENERGY DEVELOPMENT PROMOTED																								
5.1 Assist private developers with pre-feasibility studies																								
5.1.1 Pre-feasibility support to 6 developers (max. 45 MW)																								
OUTCOME 6: BUILT CAPACITY AND STRENGTHENED INSTITUTIONS																								
6.1 Strengthened technical capacity of main stakeholders																								
6.1.1 Training programme for wind developers and stakeholders																								
6.1.2 In-depth training for developers on resource assessment																								
6.1.3 In-depth training on available wind energy technologies																								
6.2 Strengthened capacity of institutions																								
6.2.1 Awareness raising on wind energy																								
6.2.2 Strengthening of DEAT (regarding EIA for wind power)																								
6.3 SAWEA has been strengthened institutionalised																								

OUTPUTS AND ACTIVITIES	PHASE 1																							
	YEAR 1 (months)												YEAR 2 (months)											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
6.3.1 Training of SAWEA; info exchange with other associations																								
6.3.2 Assistance to SAWEA to prepare programme																								
OUTCOME 7: MONITORING, LEARNING & EVALUATION																								
7.1 Monitoring, learning, feedback, evaluation																								
7.1.1 Development baseline and M&E plan																								
7.1.2 Annual audits and external evaluation																								
7.1.3 Six-monthly reports with results and lessons learned																								
7.1.3 Organize annual workshop on project results																								
7.1.4 Formulation of follow-up 'technical assistance and investment' phase; sourcing of funding (incl. GEF)																								
PROJECT MANAGEMENT																								
0.1.1 Project formalization																								
0.1.2 Institutional harmonization																								
0.1.3 Personnel selection and hiring																								
0.1.4 Inception workshop and report																								
0.1.5 Day to day project administration and coordination																								
0.1.6 APR, quarterly progress and financial reporting																								

Section IV: Annexes

Annex 1. Baseline and Emission Calculations

Background

This calculation is based on the project-level calculation formula provided by the GEF for *direct, direct post-project,* and *indirect* CO_2 reductions. The field data was gathered during several missions carried out during the PDF B implementation in 2003 and 2004.

Baseline Scenario

The following approach is considered to evaluate the baseline scenario:

- Use of the standardized baseline for the South African electricity mix as referred to in CDM operations for small-scale projects; emission of 0.89 kg CO_2/kWh.
- Carbon dioxide emissions due to electricity generation are measured only in terms of CO_2/GWh, not considering the emissions of other GHG gases such as NO_x and CO.
- The following factors are considered for the calculations:
  - *Direct* investment in the Darling wind farm, Phase I (which is part of co-financing of the FSP) made during the FSP duration = 5.2 MW
  - *Post-project* investments made after the FSP duration resulting from investment preparation and removing of key barriers made during the 2-year project period the FSP = 45 MW.
  - *Indirect* reductions = the remaining 'commercial' potential identified during the PDF-B is a multitude of the initial 50.2 MW anticipated in the short-term. However, for the sake of calculations a very conservative estimate of about 100 MW will be used. It is however to be noted that continued wind energy development in South Africa will only take place if a combination of active financial Government support in combination with green premiums creates sufficient financial resources to close the incremental cost gap. Setting up the structures required to reach this situation are activities that will be executed with direct assistance from the FSP in South Africa.
  - Influence period for CO_2 reductions for wind power plants: 20 years being the anticipated minimum lifetime of wind farms
  - Average wind-power plant factor = 0.27 for *direct, direct post-project and indirect* investments, based on considerations of possible sites in South Africa, and further discussions with several wind-power project developers.
  - GEF Contribution Factor Type 3 = 0.60, i.e.: *"GEF contribution is substantial but a small amount of indirect CO_2 can be attributed to the baseline"*.
  - Emission Ratio (tons of CO_2/MWh) = 0.89.

Calculations

The following Table A.3.1 shows the outcome of the calculations:

Table A.3.1 Total CO_2 reduction due to the removal of barriers to wind energy development in South Africa

Sources of Reductions	Capacity (MW)	Plant Capacity Factor	Annual Production (MWh)	Emission Ratio (kg CO_2/kWh)	GEF Contribution Factor	Total CO_2 reduction per year	Period (yrs)	Total (tons CO_2)
Direct	5.2	0.27	12,299	0.89	1	10,946	20	218,922
Post-project	45	0.27	112,491	0.89	1	94,725	20	1,894,500
Indirect	100	0.27	236,520	0.89	0,6	126,311	20	2,526,034
Total	**150.2**		**362,010**			**231,982**		**4,639,454**

Conclusion

The total annual wind power production is 367,010 MWh that would otherwise have been generated through conventional (fossil-fuel/coal-based) means. Total avoided (direct and indirect) emissions are around 4.6 million tons of CO_2 over a 20 year period.

Annex 2. Elements of a possible follow-up 'technical assistance and investment' phase

Component: Public sector incremental funding

- Setting up of an implementation structure for the longer-term financial instruments that have been detailed under the FSP and accepted by the Government;
- Implementation of the specific financial instruments that have been designed for providing by the Central Energy Fund (CEF) up to US$ 8-9 million to support the implementation of 45 MW of wind power capacity;
- Continuous monitoring of the financial instruments' implementation and using the information gathered to improve the implementation set-up or the financial instrument

Component: Green power funding

- Continued implementation and monitoring of the Green Power Guarantee Scheme for the City of Cape Town;
- The design of a Green Power Guarantee Scheme that will be available on a national scale for guaranteeing green power from wind farms and active marketing of the Green Power Guarantee Scheme will be undertaken to ensure maximum external financial support. (The scheme will in principle be accessible for multiple end-users; see Annex 4 for more details of such a scheme);
- Design and implement a public information campaign on green power generation and consumption to be implemented at the provincial and national levels (this should complement – and assist – the individual green power marketing activities);
- Institutionalise the TREC activities through the design and setting up of an independent body that will focus on the following (summarized) activities:
    - Green power plant accreditation process,
    - Verification of data for issuing certificates,
    - Issuing of certificates,
    - Trading of certificates,
    - Redeeming of certificates;
- Organise and implement national information and awareness campaigns on TRECs (closely linked with the green power marketing activities)

Component: Long-term policy and implementation framework

- Initiating and actively steering the process of implementing the recommendations of the FSP regarding the inclusion of wind energy into the overall energy policy and regulatory framework;
- Continuous monitoring of the wind and renewable energy policy (changes) and using the information gathered to improve future policy making

Component: Commercial wind energy development

- Based on the preliminary outcomes of the (pre-)feasibility studies for up to 45 MW installed capacity (as carried out in the FSP), combined with the wind measurements for a private wind

developers, make a decision on which projects would be actively supported in their further development;

- Assist selected private developers with the development of detailed engineering and financing plans. This should include all activities required for technical as well as financial due diligence, including the legal issues that have to be dealt with;
- Investment by private developers wind power generation facilities in 3-4 sites (equivalent to a combined capacity of about of 45 MW. At an estimated investment of a US$ 1.2 million per MW (including all grid-connection hardware such as connection lines, transformers and sub-stations), the total investment would then be around US$ 54 million
- Monitoring of these 3-4 wind farms, including the Darling wind farm, looking at all aspects related to the development of a wind farm (like costs, timely delivery of goods, time spent in studies, license approval, etc.). This will provide essential information for further expansion or replication of the wind farms, and especially useful for planning authorities and wind energy developers;

Component: capacity building and institutional strengthening

- Design and implementation of a training programme on financing renewable energy investments for lending officers and senior decision making personnel at commercial banks, as well as to potential venture capitalists;
- Facilitating the active involvement of a selected number of financial institutions in the development and financing of the commercial wind energy projects that are actively supported by the proposed initiative;
- Design and implementation of a training programme for the operation and maintenance of wind power plants;
- Assist SAWEA with the search of an 'institutional home' to ensure long-term existence (for example, the DBSA has already indicated that they are willing to play a mentorship role for SAWEA);
- Organization of workshops and seminars on wind energy for power generation, including topics such as a) energy pricing mechanisms for green power, b) transmission and possibly distribution aspects of intermittent power in a wholesale power market, and c) status update on wind power developments specifically (wind measurements, wind map updates, wind power licensing, wind farm developments, etc)
- Facilitate and establish working relationships between wind energy promoters in Europe, US, Australia with promotors in and South Africa

Annex 3. Green Power Guarantee Scheme City of Cape Town

Green Power Guarantee Scheme for the Purchase of the Green Power produced by the 5.2 MW Darling Wind Farm

Guiding principles:

- The energy cost in the PPA between the City of Cape Town (CCT) and Darling 5.2 MW IPP (DARLIPP) includes a (green power tariff) premium of R0.27c/KWh and a baseline tariff of R0.21c/KWh (which includes R0.11c/KWh of transmission charges) adding up to R0.48c/KWh. The green power tariff adds up to R3.56 million/annum for the CCT/DARLIPP PPA adding up to a total green premium of R87.57 million over 20 years. The estimates for the City of Cape Town green power market are 50.6 GWh/annum which is equivalent to 20 MW generation capacity and an approximate R10.6 million/annum.
- Maximum support from the guarantee scheme amounts to USD 1,4 million over 5 years which is 20% of the capital investment of a 5.2 MW wind farm (Darling Wind Farm) with a capital investment calculated at USD 7 million;
- Maximum period of active support is equal to the active UNDP/GEF support; i.e. 2 years (phase 1, max. US$ 560,000) and, if a successor follow-up phase 2 is approved, another 3 years (max. US$ 840,000);
- Financial support will be for the Distribution Company of the City of Cape Town who purchases all (100%) of the green power produced by the Darling 5.2 MW Wind Farm and sells this on to progressive customers in their distribution area;
- The financial support will be in the form of a guarantee scheme that can be made use of when the anticipated uptake of green power does not result in a 100% sale of the green power purchased from the Darling 5.2 MW Wind Farm; i.e. 13.2 GWh/annum. Given the current exchange rate and the agreed premium of 0.27 c/KWh CCT is buying green electricity from DARLIPP worth USD 540k/annum. Up to a maximum of USD 280k/annum can be drawn from the guarantee scheme in case the electricity cannot be sold on to voluntary green customers.
- The City of Cape Town (CCT) takes the market risk for the green power tariff over a 20 year period. The CCT will be buying 13.2 GWh/annum at R4.8million/annum escalating by 6%/annum that adds up to a total green premium risk of R87.57 million over 20 years. The CCT (in terms of the licence conditions) has to sell to willing buyers and does not have the right to pass it on to their captive customers. The guarantee scheme only covers part of their annual risk from day one (and after 2 years even less) and does not create any room for the CCT to bank on the scheme in terms of their total and long term risk. It should be noted that the CCT will not enter into a 20 year PPA should they doubt their ability to successfully penetrate the green power market, the total support of the guarantee scheme of $1.4 million (R9 million) to the CCT (though small in terms of their total risk} creates the necessary incentive and opportunity for them to negotiate and accommodate the risk;
- Shortfall in uptake of the green power will be assessed and averaged on a twelve-month basis and subsequent payments from the guarantee scheme will be in line with that; i.e. one payment every twelve months;
- Each twelve-month period will constitute its own administrative unit and no shortfalls from one twelve-month period can be carried forward; i.e. if no use will be made of the guarantee scheme within a twelve-month period, the amount that was available for that twelve-month period lapses and will no longer be available for compensating future green power sales ‘losses’;

- An independent institution – appointed by the SAWEP Project Steering Committee – will closely monitor the green power sales of the distribution company of the City of Cape Town, and the subsequent need to use the green power guarantee scheme;
- Payments from the green power guarantee scheme will be made from a dedicated account set up by the Project Management Unit for the sole purpose to receive payments from UNDP and to disburse payments to the City of Cape Town distribution company;
- First twelve months of the guarantee scheme will commence upon the last party signing the project document of the SAWEP full-scale programme. In the table below this anticipated date of programme commencement is 1 June 2007. In case this will be later, the dates in the table will have to be adapted accordingly; and
- It should be noted that what is presented here is a proposal for the guarantee scheme as it will be further detailed and implemented in the City of Cape Town. At the outset of the proposed initiative the proposed guarantee scheme will be discussed and negotiated with the City of Cape Town after which implementation arrangements will be detailed by the Project Management Unit.
- Funds that have not been used at the end of phase 1 will go either go into the dedicated guarantee scheme account for the follow-up phase 2, or, if phase 2 will not be approved, will be used to help the Government set up a national green power guarantee scheme.

Phase 1: 2 years (2007-2009)	**Maximum amount (in US$)**
1 June 2007 – 31 May 2008	280,000
1 June 2008 – 31 May 2009	280,000
Sub-total for phase 1:	*560,000*
Assuming PHASE 2 will be approved	
Phase 2: 3 years (2009-2012)	
1 June 2009 – 31 May 2010	280,000
1 June 2010 – 31 May 2011	280,000
1 June 2011 – 31 May 2012	280,000
Sub-total for phase 2:	*840,000*
GRAND TOTAL Phases 1 and 2	**1,400,000**

***Table**: Green Power Guarantee Scheme disbursement budget from the UNDP/GEF supported SAWEP*

Annex 4. National Green Power Guarantee Scheme

National Green Power Guarantee Scheme for the Purchase of the Green Power produced from up to 45 MW installed wind power

Guiding principles:

- It is anticipated that the success of the CCT/DARLIPP green power guarantee scheme will trigger the interest of other distribution companies to be involved in similar activities; notably those distribution companies in Johannesburg (City Power); Durban and other larger cities/municipalities;
- As a result of the PDF B activities the national green power market in South Africa has been estimated in the region of 300 GWh/annum, based on a 0.5 % penetration rate, which corresponds to an approximate 120 MW installed generation capacity;
- Only when the overall programme enters into phase 2 there will be a national guarantee scheme implemented and hence it will be operational from the beginning of phase 2;
- Maximum period of active support depends on the actual use of the guarantee scheme and could stretch beyond the project period. Once not all the funds available for the guarantee scheme have been fully exhausted by the end of the project period, a mechanism will be designed that will make it possible to continue offering green power guarantees up to the maximum amount that will be made available through UNDP/GEF financial assistance (see table below);
- Financial support will be for the institutions/entities (mostly Distribution Companies) who purchase the green power produced by wind farms and sell this on to progressive customers in their distribution area;
- The financial support will be in the form of a guarantee scheme that can be made use of when the anticipated uptake of green power does not result in a 100% sale of the green power purchased from wind farms **other than** the 5.2 MW Darling Wind Farm for which a separate guarantee scheme will be operational;
- Shortfall in uptake of the green power will be assessed and averaged on a twelve-month basis and subsequent payments from the guarantee scheme will be in line with that; i.e. one payment every twelve months;
- An independent institution – appointed by the SAWEP Project Steering Committee – will closely monitor the green power sales of the green power distribution companies, and the subsequent need to use the green power guarantee scheme;
- Payments from the green power guarantee scheme will be made from a dedicated account set up by the Project Management Unit for the sole purpose to receive payments from UNDP and to disburse payments to the distribution companies accepted to receive support from this guarantee scheme;
- First twelve months of the national guarantee scheme will commence 2 years after the last party signing the project document of the SAWEP full-scale programme. In the table below this anticipated date of programme commencement is 1 June 2007. In case this will be later, the dates in the table will have to be adapted accordingly; and

- It should be noted that what is presented here is a first draft proposal for a national guarantee scheme that will be further developed during the first phase of the proposed initiative in close collaboration with an anticipated 2 or 3 selected Distribution Companies.

Phase 1: 2 years (2007-2009)	**Anticipated amount (in US$)**
1 June 2007 – 31 May 2008	0
1 June 2008 – 31 May 2009	0
Sub-total for phase 1:	*0*
Assuming PHASE 2 will be approved	
Phase 2: 3 years (2009-2012)	
1 June 2009 – 31 May 2010	600,000
1 June 2010 – 31 May 2011	600,000
1 June 2011 – 31 May 2012	600,000
Sub-total for phase 2:	*1,800,000*
GRAND TOTAL Phases 1 and 2	**1,800,000**

Table*: National Green Power Guarantee Scheme disbursement budget from the UNDP/GEF supported SAWEP*

Annex 5. Reports Available Upon Request

- Financial model to calculate wind energy costs, benefits and subsequent investment requirements – author: Hugh Ashby;
- Green power market survey for the City of Johannesburg – author: MSSA;
- Green power market surveys for the City of Cape Town – authors: MSSA and Anders Nielsen;
- Detailed proposal for wind resource assessments –author: CSIR;
- Economic and financial calculations and modelling for renewable energy strategy formulation ('renewable energy supply curve') – authors: Conningarth Economists;
- Green funding mechanisms – author: AGAMA Energy;
- Assessment of financial barriers and barrier removal activities – author: Sven Kreher;
- A practical barrier assessment and barrier removal activities for wind power development in South Africa – author: NuPlanet;
  and Financing of wind farms in South Africa – author: Wolfgang Mostert Associates.

Annex 6. Terms of References

Terms of Reference of Project Manager (PM)

Duration: 2 years (24 work-months)
Location: South Africa
Remuneration: As nationally recruited consultant, commensurate with qualifications, skills and experience

Description of tasks and duties:

The Project Manager will be appointed by DME and UNDP to manage the execution of the project, including the mobilization of all project inputs, supervision over project staff, consultants and sub-contractors. The Project Manager will manage the DME Project Management Unit, will be fully accountable to the Project Steering Committee for satisfactory execution of the entire project and will be responsible for meeting government obligations under the Project, under the national execution modality. The Project Management Unit will have operational and financial autonomy, including the authority to select and sub-contract specific project activities or components to local and international consultants or government agencies. He/She shall perform a liaison role with government, UNDP and other project partners and maintain tight links with other donor agencies providing co-financing.

The incumbent reports directly to the Director of Renewable Energy of the DME and liaise closely with the UNDP program advisor on project progress and related issues. His/her tasks will at least include:

Project Management:

- Day-to-day management and coordination, monitoring and evaluation of the project activities and the PMU;
- Lead the detailed work planning and supervise the implementation of the project activities, including:
    - Transfer Atlas budget into detailed output based budget and planning;
    - To prepare and execute a detailed work plan for the project at the outset of the PDF B implementation, limited to the GEF funding;
    - To prepare and execute the necessary management arrangements for the work plans related to the co-financing budgets;
    - Allocation of GEF contribution according to prepared work plan and financial reports, approved by DME and UNDP;
    - Preparation of work plan and financial reports, combined APR/PIR (annual project report/project implementation review);
    - Procurement and Contract Management of the other PMU staff as required and of all for subcontracting companies and individuals, according to UNDP and DME procedures;
    - To identify national and international experts and institutions to work on the project (this activity to be carried out in close consultation with the Programme Steering Committee (PSC), the Technical Advisory Committee, the UNDP, and the DME);
    - Providing overall guidance to subcontracting consultants, including contract management, supervision of field operations, logistical support and review of deliverables/reports;

- To alert the PSC pro-actively on significant deviation from project outcomes and on important quality issues;
- Undertake other results based management duties that contribute to the effective functioning of the project. Prince II techniques, processes and tools are referred to as a minimal best practice; and
- Adhere to UNDP/DME procurement procedures.

Finance

- To control expenditures, keep clear and accurate record of expenditure, and to assure an adequate management of resources provided for the project;
- To oversee financial reporting to the PSC, UNDP and GEF;
- To inform the PSC pro-actively about significant variations in the programmed budget;
- To deliver within the prescribed timeframe and budget.

Communication and Coordination

- Work closely together with UNDP country office and DME in project guidance and progress and convene regular meetings to present the work plan and financial reports. In these meetings, DME and UNDP review and authorize the financial and progress reports, as well as update work plans prepared by the project manager;
- Work closely together with the Project Steering Committee (PSC) and the Technical Advisory Committee in:
  - Informing on project progress and budget variations and advising on the policy direction of conduct of activities of SAWEP during its implementation;
  - Serving as secretary to PSC, by convening the meetings of the PSC and maintaining minutes of meeting.
- Liaise with the project partners and stakeholders (DME, DEAT, NER, CEF, Eskom, DBSA, municipalities, private developers, SAWEA members, distribution companies, CSIR, and other relevant national organisations and NGOs);
- Advise DME and train staff in documentation of best/good practices, lessons learned and in ensuring the mechanisms for up-streaming programme achievements from downstream pilot interventions;
- Outreach and communication in the media, prepare publications, assist in parallel initiatives and cross-cutting issues;
- Establish excellent relationships with the stakeholders and involve in resource mobilization for the second phase;
- Take a lead role in the organisation of project workshops and dissemination of results of the projects.

Monitoring and Evaluation

- Make sure the project complies with UNDP GEF and DME M&E procedures;
- Form part of the phase-1 project Monitoring and Evaluation mission and formulate the Phase 2 Work Plan;
- Facilitate the Mid-term evaluation and the Tri-Partite review;

- To install and execute an internal quality control and audit function throughout the project.

Minimal Qualifications:

- Post-graduate training in economics or business administration, engineering (with a strong energy component and project management background);
- Extensive knowledge of wind sector in South Africa and internationally, including the main institutions and stakeholders in the field as well ass of the policy, regulatory and financial aspects;
- Familiarity with financial engineering of energy projects;
- Proven ability to manage financial, human and material resources of development projects;
- Knowledge of UN, EU and other international or bilateral organisations and their policy, program and operations;
- Proven ability to work in a complex environment with a lot of different stakeholders within a specific political context;
- High ability to relate with people of any level;
- Excellent skills in budgeting, planning, coordination, leadership, communication, pro-active problem solving;
- At least 10, preferably over 15 years of professional project management and contract management experience relevant in the context of this project (infrastructure, sustainable development, energy and environment); and
- Excellent knowledge of spoken and written English.

Deliverables:

- Finalised Terms of Reference, Request for Proposals, Evaluation Reports and draft Contracts for PMU staff as required and for subcontracting consultants;
- Work plan and financial reports;
- Annual progress reports;
- Minutes of PSC meetings;
- Minutes of Regular (f.e. bi-weekly) project team meetings;
- Agenda for project workshops and meetings;
- Up to date Hard Copy and Digital Project Filing System in place containing at least 1)All relevant communication and minutes, 2) Periodic Project Quality Control reports 3) all draft and final documents, 3) Finance section, 4) Planning section, etc;
- Up to date Logs of Projects Issues, Quality and Risk logs; and
- Achieving pre-defined targets as defined in the logical framework within the forecasted time and budget.

Terms of Reference of Project Management Unit (PMU)

The responsibility of the PMU is to co-ordinate all the project-related activities, and to ensure that the expected outputs are completed in time and budget and they comply with the GEF criteria and requirements. The PMU is headed by the Project Manager (see ToR). The PMU will be supported by an administrative person and through specialised subcontracted consultancy activities.

The Terms of Reference for the admin staff and consultants will be prepared at the outset of the implementation of the project activities by the executing agency jointly with the Project Manager and will be reviewed by the Project Steering Committee.

In addition to the general responsibility of the PMU as indicated above, there are a number of specific activities to be carried out by the PMU, which are listed under the ToR of the Project Manager.

Finally, in order to install the opportunity for capacity transfer, the DME will assign some of its staff to the PMU.

Terms of Reference of Project Steering Committee (PSC)

The Project Steering Committee (PSC) will be created in order to steer and advise the project's implementation in direct consultation with the Executing Agency (DME), the PMU and its Project Manager. The Technical Advisory Committee will meet at least 4 times a year and will provide input to the PSC. The Committee will be chaired by the DME

Duties:

The responsibilities of the PSC include the following:

- Advise and approve the ToRs of PMU staff and subcontracting consultants, to be done jointly with the Project Director;
- Approving of the staffing and operational infrastructure of the PMU;
- Approving the contracting of selected consultants/firms to undertake the activities as outlined in the Terms of References mentioned above;
- Approving the annual work plan and progress reports, the first plan being prepared at the outset of the implementation of the project activities;
- Closely follow, for example through reviewing the six monthly and annual reports, the project's implementation progress and recommendations for improvements, if deemed appropriate;
- Act as a platform for sharing information on the project and facilitate the dissemination of information on the project's progress to especially relevant channels within South Africa.

The PSC will work closely with the Technical Advisory Committee and with the Darling Demonstration Wind Farm Project Steering Committee (DDWFPSC); where possible use will be made of existing PSC-like structures. The responsibilities of the Technical Advisory Committee are to inform and communicate amongst all stakeholders and to report to the PSC.

Frequency of meetings:

The PSC will meet 4 times the first year; 3 times the second year; and twice annually for years 3 to 5 with the objective of monitoring project progress, coordinating institutional roles, and securing any information required for the project. The Chairman of the PSC will serve as the link to DME.

Members:

At minimum, representatives of Department of Minerals and Energy (DME), UNDP Country Office (the GEF-Implementing Agency), Department of Environment and Tourism (DEAT) will take seat in the PSC.

The PSC will be complemented with external experts as deemed appropriate by the executing agency. During the first meeting of the PSC, the creation of a formal reporting/feedback arrangement will be proposed for the explicit provision of opportunities for a range of industry stakeholders to be involved in the project throughout the various stages of its implementation. This arrangement will have to guarantee full transparency at the national level. The PSC will establish a technical advisory committee that could function as a platform to present and share ideas as well as to solicit specific inputs from its members that are envisaged to come from different sections within the wind project development community (such as NT, Eskom, CCT, City Power, SAWEA academic, finance, consulting engineers, NGO's and project developers/owners).

Section V: Co-financing letters and other commitments

Co-financing letters

Confirmed letters of commitments from co-financiers

Please see separate file.

Purchase Power Agreement (PPA), Darling Wind Farm, Phase 1

Please see separate file.

Signature Page

Country: South Africa

UNDAF Outcome(s)/Indicator(s): Policy for wind energy development formulated

Expected Outcome(s)/Indicator (s):
Goal 3. Energy and Environment for Sustainable Development, Service Line 3.3 – Access to Sustainable Energy Services.

Expected Output(s)/Indicator(s):
A. Government, civil-society and private sector capacities strengthened and policy advice provided to integrate local, national, regional and global sustainable development objectives into NSSD and international agreements.
B. Integration of sustainable development, poverty alleviation reduction documented at the policy, programme, project and community levels through success stories, best practices, national competitions; and important role demonstrated of communities, women, indigenous people and indigenous knowledge systems in protecting the rural and urban environments, reducing poverty and HIV/AIDS, and maintaining sustainable livelihoods.

Executing partner: Department of Minerals and Energy (DME).

Other Partners: Department of Environmental Affairs and Tourism (DEAT), Department of Foreign Affairs (DFA), Department of National Treasury.

Programme Period (phase 1): 01/06/2007- 30/05/2009
Programme Component: Access to sustainable Energy Services
Project Title: Technical Assistance to the South African Wind Energy Program (SAWEP)
PIMS ID: 1637
Project ID:
Project Duration: 2 years
Management Arrangement: NEX, PSC & support from UNDP

Total budget:	**USD 12,339,000**
Allocated resources:	
GEF:	USD 2,000,000
Co-financing:	
• SA government through CEF:	USD 2,655,000
• Danida:	USD 2,609,000
• DBSA:	USD 3,495,000
• Darlipp IPP:	USD 700,000
• City of Cape Town	USD 580,000
• In-kind contributions (Government (DME, DBSA, CEF)	USD 300,000

On behalf of:	Signature	Date	Name/Title
Executing Agency DME			Adv Sandile Nogxina Director General, DME
GEF Focal Point DEAT			Pam Yako, Director General, DEAT
National Treasury			Shaheed Rajie, Chief Director
UNDP			Scholastica Sylvan Kimaryo, Resident Representative, UNDP