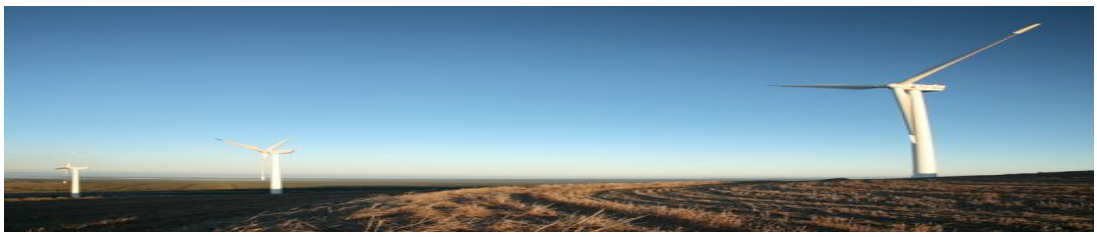
Terminal Evaluation Report

South Africa Wind Energy Programme (SAWEP) – an UNDP supported Technical Assistance programme

South Africa

September 2011



Darling Wind Farm June 2011

South Africa Wind Energy Programme (SAWEP) – an UNDP supported Technical Assistance programme

Terminal Evaluation Report

Evaluation prepared by LTE Energy Pty Ltd

South Africa

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1 Executive summary

1.1 Brief description of project

The overall aim of the SAWEP Full Size Project Technical Assistance was to assist the South African Government and stakeholders in creating an enabling environment for the commercial replication of grid connected wind farms and the establishment of a vibrant and sustainable wind industry in South Africa.

The objective of the project was to install and/or prepare the development of 50.2 MW of wind power and a project total anticipated emissions reductions of 4.6 million tons of CO_2 equivalent (over 20 years). The project was intended to 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).

The SAWEP project was in initially (2002) designed as a 5-year program to contribute to the removal of barriers for establishment of a wind industry in South Africa, and the establishment of a wind industry in South Africa. The present SAWEP 3 year project, initiated in March 2008, focussed mainly on the removal of barriers. These barriers related to regulatory, institutional, financial informational, knowledge and capacity barriers. However, the overall objectives relating to both removal of barriers and implementation of wind farms, e.g. the 50.2 MW installed objective, was maintained for the present 3 year project.

The project was divided into seven main components to contribute to a lowering of the identified barriers within a full-sized project. A number of outputs were linked to the seven components as follows:

Component 1: Increased public sector incremental cost funding
Output 1.1: Detailed financial instruments to stimulate commercial wind energy developments have been designed and accepted for implementation by the Government
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
Output 2.2: Green power marketing activities for selected urban centres are designed and actively supported by UNDP/GEF
Output 2.3: A system for Tradable Renewable Energy Certificates (TREC) has been designed, set-up and under implementation
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
Component 4: Wind resource assessment
Output 4.1: Wind measurements and monitoring at 20 sites has been supported
Output 4.2: Up to ten private developers have been assisted with their wind measurements for sites identified for commercial wind farm developments
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
Component 6: Built capacity building and strengthened institutions
Output 6.1: The technical capacity of the main actors involved in wind power generation has been strengthened
Output 6.2: The South African institutional capacity of the key institutions

involved in renewable energy (power) development has increased
Output 6.3: The South African Wind Energy Association (SAWEA) has been strengthened and institutionalized
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
Component 7: Dissemination
Output 7.1: Monitoring, learning, adaptive feedback and evaluation

1.2 Context and purpose of the evaluation

In accordance with GEF policies, all full and medium-size projects supported are subject to a final evaluation upon completion of implementation. In addition to provide an independent in-depth review of implementation progress, this type of evaluation is responsive to GEF Councils decisions on transparency and better access to information upon completion of a project.

The specific purpose of the SAWEP terminal evaluation is to assess to what degree the project objectives were achieved, in particular:

- Assess overall performance and review progress towards attaining the projects objectives and results including relevance, efficiency and effectiveness
- Review and evaluate the extent to which the project outputs and outcomes have been achieved
- Assess the extent to which the project impacts have reached or have the potential to reach the intended beneficiaries
- Critically analyse the implementation arrangements and identify strength and weaknesses in the project design and implementation
- Describe the projects adaptive management strategy
- Review the clarity of roles and responsibilities and the level of coordination between various agencies and institutions involved
- Assess the level of stakeholder involvement, including the efforts of UNDP in support of implementation
- Review donor partnership processes

- Describe key factors that will require attention in order to improve prospects for sustainability or project results achieved

- Identify and document the main successes, challenges and lessons that have emerged.

1.3 Main conclusions including rating

It can in general be concluded that several outcomes of the project has been implemented with significant and impressive achievements (HS), while moderately satisfactory to satisfactory (MS - S) has been reached for the remaining outcomes. The signing of PAA and purchase of green electricity from Darling Wind farm to Cape Town since May 2008 was a positive achievement, as were project activities in the areas of capacity building of local wind stakeholders and the design, implementation and monitoring of the comprehensive national wind resource assessment mapping study. In general did the project contribute significantly to the increased attention to renewable energy, in particular wind energy, in South Africa during the project period. An attention that in August 2011 resulted in the governmental tendering of almost 2,000 MW of wind energy to the private independent power producer (IPP) sector.

The project mainly focused its efforts in the following three outputs: (i) Development of Wind Atlas (Output 4.1 with highly increased budget through the reallocation of funds from other outputs); (ii) Design and support of the guarantee scheme for the Darling Wind Plant – City of Cape Town PPA (outputs 2.1 and 2.3), (iii) Investigation into the development of a Wind Industrial Strategy for South Africa (relevant to output 3.1), and to a lesser extent also to: (iv) Development of business plan for SAWEA (relevant to output 6.3) and (v) Monitoring, learning, adaptive feedback and evaluation (output 7.1).

The remaining outputs only received little attention during the project period, due to, in the opinion of the evaluation team, a correct reprioritization of the project's objectives, outputs and activities during project implementation. It has to be recognised that, parallel to the project, numerous other national initiatives, funded by the government and bilateral donors, produced significant impacts and results that complement the activities of the SAWEP.

The 50.2 MW target was in many ways an over-ambitious goal poorly linked to planned outputs and activities of the project, why the failure to reach this target is not deemed critical by the evaluation team.

During project implementation, SAWEP continued to play a highly visible, influential and critical role in catalyzing public interest in wind energy in South Africa and assisted the national governmental departments such as DoE, DTI, DST, National Treasury, NERSA and Eskom with provision of relevant and required regulatory and implementation frameworks needed for investment in the sector. The SAWEP project was included as a success case in the UN 2010 report on Climate Finance - Spending Wisely.

GEF disbursements proceeding as planned, and budgets were flexible and appropriately reallocated between the different outputs during project implementation in order to reflect the actual priorities of the executing agency (Department of Energy – DoE). The SAWEP PMU has generally done a good job managing the project and developing strong relationships among project stakeholders. The SAWEP project manager has been instrumental and actively involved in representing the DoE in the coordination of parallel renewable energy initiatives. In that manner, he very effectively acted as an information hub on behalf of the DoE and secured that those initiatives have been complementary to the SAWEP. He has furthermore actively and successfully secured donor coordination within the sector, for example through successfully creating co-funding with the Danish Embassy on several projects and TA coordination with the German GtZ thereby substantially levering the impact and scope of the SAWEP project.

Based on review of the available information, stakeholder interviews and consultation and analysis of output – input correlations, the conclusion is that the project has been a success. In particular significant achievements has been reached on:

- The professional carrying out of national wind resource assessments
- The promotion of commercial wind energy development
- The strengthening of institutional capacity at the national level
- Internal coordination and focus at DoE regarding renewable energy and wind energy in particular
- Donor coordination and leverage of programme outcomes through co-funding.

Below is provided summary conclusions for the outcomes (components) and outputs of the projects. Each outcome and output furthermore has been rated utilising the UNDP rating format.

Components and Outputs	Summary conclusions	Rating
Component 1: Increased public sector incremental cost funding	Public funding was made avaliable at the end of the project period. The project achievements and activities can indirectly be linked to this result	S
Output 1.1: Detailed financial instruments to stimulate commercial wind energy developments	The project assisted the Government of South Africa with detailing the most appropriate financial instruments that should be made available to stimulate commercial wind energy developments; e.g. did the project, in	S

have been designed and accepted for implementation by the Government	cooperation and co-funded with the Danish Embassy (good example of donor coordination), prepare a National Business Case for Renewable Energy report, which provided a relevant input to the ongoing debate and dicsussion on which instruments to utilise. SAWEP was furthermore a member of NERSA REFIT Advisory Committee, NERSA announced (March 2009) REFIT (wind R1.25/kWh). Ca 0,05 millUSD from the project was utilised for this output	
Component 2: Green power funding initialised	The project played an active and direct role in creating substantial focus on green power funding, but the model was not replicated as the REFIT model took preceedence in the country	S
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	The project assisted several initiatives geared towards green power marketing and setting up and implementing Tradable Renewable Energy Certificates (TRECs). The key initiative was the provision of an innovative green power guarantee scheme developed under the PDF B; City of Cape Town Green Power Guarantee Scheme hosting agreement signed by DoE and DBSA, USD560,000 transferred from SAWEP to DBSA account. City of Cape Town started to sell in April 2010 green certificates (1% of 14 GWh green power bought by Sept 2010). A Green PPA was established with Cape Town Municipality that did not require the scheme to be activated. Funding was reallocated mainly to the wind atlas output, and some still remain un-spent The project furthermore supported the finalisation of DoE - CCT agreements and the establishment of a final draft Domain Protocol for Voluntary Tradable Renewable Energy Certificate System final report.	S
Output 2.2: Green power marketing activities for selected urban centres are designed and actively supported by UNDP/GEF	The project manager very early correctly assessed the reduced potential for green power schemes in the country as the premium can not compete with the REFIT tariffs, still a number of relevant marketing activities were undertaken	MS

Output 2.3: A system for Tradable Renewable Energy Certificates (TREC) has been designed, set-up and under implementation	A draft TREC protocol was developed and funded by project (0,1 millUSD) The development of the protocol was undertaken in an effective and inclusive manner with all relevant stakeholders involved. The protocol is ready for use, if the need should arise in the future	S
Component 3: Long-term policy & implementation framework for wind energy developed	Important and key national policies was developed during the project period with direct and indirect support from the project	S
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	The project was actively involved in the development of five key policy papers: (i) South African Renewable Energy Sectoral Business Case study and report (funded by Danish Embassy) (see output 1.1.), (ii) Investigation into the Development of a Wind Energy Industrial Strategy for South Africa final report submitted Wind Energy generation is recognized in DTI IPAP2 (co-funded and managed with the Danish Embassy – ca. 0,05 millUSD), (iii) SAWEP became a member of the White Paper on Renewable Energy Review committee securing the final draft Revised White Paper on Renewable Energy report delivered, (iv) Coordinating with DoE, DAFF and wind industry comments on DAFF draft Wind Farming guidelines v1; and (v) Coordinating with DoE, DAFF, DEA and Eskom regarding DEA study: Development of a Strategic Environmental Framework for the optimal allocation of wind farms. The project manager actively was particiting in internal and external fora for discussion of policy development. The project was indirectly involved in the development of other key policies developed in the projecg period (the REFIT, IRP, PPA, Grid Codes, Connection Codes, National Treasury regulations, etc.)	S
Component 4: Wind resource assessment	The project prepared the first professional wind map for South Africa, utilising the latest technology in the field. This wind map is of great use for private sector developers and the national and provincial renewable energy planning sector. The map was made public	HS

	available	
Output 4.1: Wind measurements and monitoring at 20 sites has been supported	A comprehensive national wind map has been developed, co-funded with the Danish Embassy, and in close cooperation with a large group national and international wind research insitutions and experts (SANERI Executing partner, Implementation partners: Riso, CSIR, UCT, SAWS), cover Western Cape and areas of Northern and Eastern Cape. The map is the first wind map for South Africa, developed according to the latest methodologies (meso-mapping) and present a large step forward for the industry and the national level renewable energy planning efforts. By far the largest part of the budget, ca 1.4 mill USD, was utilised for this outputby assisting interested public and private sectors entities with the generation of reliable wind energy data and other necessary information for wind energy development. The project played a crucial role in the development of the Wind Atlas project document (for reference see http://aonrg.com/Wind Atlas doc.pdf). SAWEP funding R6.8 million, co-financing leveraged from Danish Embassy DKK9.9 million. Preliminary meso scale wind atlas (mean wind speed at 50 m, 5 km resolution) presented at Wind Atlas Workshop, 4 March 2010. 10 Wind measurement masts installed and operational. Wind data display and download websites launched by DoE Minister at 2nd Annual Wind Energy Seminar, 28 September 2010 (for reference see http://www.wasa.csir.co.za and http://wasadata.csir.co.za/wasa1/WASAData - currently 237 users all over the world, 6246 downloads since launch Sept 2010). The 1st Wind Atlas and database to be completed by end of 2011, beginning of 2012.	HS
Output 4.2: Up to ten private developers have been assisted with their wind measurements for sites identified for commercial wind farm developments	The wind map is a common good available to all, and of high value also for private developers in site selection and downscaling meso data to micro level data. Linked to 4.1. is training and knowledge sharing with all wind private sector developers in South Africa	S

Component 5: Commercial wind energy development promoted	Commmercial wind development was corrrectly promoted generally (through a wide number of activities, from policies, barriers, studies, wind data, seminars, knowledge dissemination, etc.) and not in relation to individual developers (as first planned)	S
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	Sawep undertook a number of activities in relation to this outputs, including (i) support to GTZ funded grid study which lead to the important finding that "the general feasibility of the integration of up to 2800 MW of wind generation in the Western Cape demonstrated", (ii) support to Wind Energy Capacity Credit studies: Coordinated DoE, Eskom, GTZ cooperation agreement (GTZ funded); (iii) 2 studies undertaken: Impact of Wind Generation in South Africa on Capacity Planning; Impact of Wind Energy in South Africa on System Operation Scenarios': 2015: 2 GW, 2020: 4.8 GW (low), 2020: 10 GW (high), (IV) Participate in the Wind Energy Capacity Credit study workshop (1&2 Nov) and public presentation 3 Nov 2010, Results: Capacity credit of wind farms is considerable 2 – 10 GW (22 – 26%), 25 GW (17.6%); Main impact on system operation will result from the limited predictability of wind speeds and not from absolute wind speed variations, (vi) Supported the updating of the SA Grid Code to provide for wind turbine connection. Published by NERSA; (vii) Supported the establishment of the SABS Wind Turbine and Components Technical Working Committee. 25 IEC standards were adopted and submitted to SABS TC 69 Working Committee. SABS is busy publishing it as SABS SANS standards. It was, correctly, early found that the project should not support individual developers with feasibility studes, due to the introduction of the REFIT programme, the availability of many developers in finding own sources, and the availability of similar funding mechnisms from e.g. World Bank, DBSA, etc. Instead developers have been supported on a general level through removal of barriers, access to the wind map results, etc., see (i) – (vii) above. No budget utilised for this output	S

Component 6: Built capacity building and strengthened institutions	Capacity was clearly built and strengthened at the national level and between the numorous key stakholders involved in pushing the wind industry forward during the project implementation phase. Less focus was placed on individual wind industrial project developers	HS
Output 6.1: The technical capacity of the main actors involved in wind power generation has been strengthened	A number of activities were undertaken including (i) Workshops conducted (SAWEA, Standards, Wind Atlas, Industrial Strategy), (ii) Presentations delivered e.g. African Utility Week, Durban, 22-25 Feb 2010; (iii) Coordinate 2nd Annual Wind Energy Seminar; (iv) Participating in SAWEC training & education initiative, (v) Coordinate local meetings and participate in GEF Climate Change mission (SAWEP selected as 1st pilot project); (vi) SAWEP Phase 1 is one of 5 case studies mentioned in the Report of the Secretary-General's High-level Advisory Group on Climate Change Financing, Nov 2010; and (vii) Supporting Wind Awareness campaign funded by Danish Embassy. A substantial number of key actors were through these activies involved in technical capacity building activities, no plan or budget, however, was prepared or utilised, providing for an ad hoc implementation of the output	S
Output 6.2: The South African institutional capacity of the key institutions involved in renewable energy (power) development has increased	The project worked actively to include, integrate and coordinate the many institutions involved in the development of the wind sector in South Africa from policy (DoE, DST, DTI, NT, etc.), research (UCT, SANERI, CSIR, RISO, etc.), private sector (SAWEA, SANEA, NBI, etc.), regulation (SABS, NERSA, etc.), producers (ESKOM), to donors (RDE, GtZ, UNDP, etc). All these players were involved in SAWEP activities (SAWEP became a brand name in the sector!). This huge coordination work undoubtly increased the national capacity to develop and promote the wind sector in the country	HS
Output 6.3: The South African Wind Energy Association	A number of interactions were made with SAWEA, and a draft business case was prepared. SAWEA is presently gaining	S

(SAWEA) has been strengthened and institutionalized	momentum, and is played an increasingly strong advocacy role in South Africa for all policy matters relating to wind development. No budget utilised	
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	The lessons learned has been disseminated extensively, e.g. through the very successful yearly national Wind Seminars with Minister representation and more than 300 participants (co-funded and implemented with the Danish Embassy), through materials, workshops, work groups, participation in meetings, etc. Some minor lesson learned works, e.g. www uploading, has still to be finalised. A follow up phase also still has to be conceptionalised and formulation in cooperation with DWEA	HS
Component 7: Internal dissemination	UNDP guidelines and standards adhered to satisfactory	S
Output 7.1: Monitoring, learning, adaptive feedback and evaluation	Done according to UNDP guidelines and standards. The quality of the monitoring, reporting, etc. is satisfactory	S

Highly Satisfactory (HS), Satisfactory (S), Moderately Satisfactory (MS), Moderately Unsatisfactory (MU), Unsatisfactory (U), Highly Unsatisfactory (HU)

1.4 Recommendations and lessons learned

SAWEP is in many ways an excellent example of the relevant role of GEF-funded technical assistance to assist governments in overcoming barriers both policy, institutional and capacity-related and to create enabling environments for private sector investment in the renewable energy sector.

The project has reached its conclusion and all outputs have been concluded, with only the wind mapping output to be concluded in 2012. The budget has been utilised appropriately with the Green Power Guarantee fund, anchored in the DBSA, still in place for the Darling Wind farm and Cape Town. It is recommended that when the Guarantee period expires, that this fund shall be utilised in the coming year for the following three purposes:

- The conclusion of the Wind Atlas. Taken the importance and national significance of this output it is recommended that this output will continue to be supported through the allocation of a portion of the DBSA Green SAWEP Fund

- A study is being commissioned, with the remaining Green Fund budgets, for a half-year analysis of the present REFIT tender process, focusing on the impact this tender will have on the development of the private sector wind industry in South Africa. The study should focus on the key national issues for sector development, e.g. job creation, local content, black ownership, and how this is linked to and will be realised through the present tender process

- Finally, if no other source becomes available (e.g. REEEP), it is also recommended that the industrial strategy for wind power in South Africa be further developed and finalised through a phase 2.

It is furthermore proposed that a SAWEP Phase 2 should be initialised, if funds are available. A SAWEP phase 2 should focus on, amongst others, the following issues:

- Support ongoing Wind Atlas project

- Support Management and M & E of REBID Phase 1

- Support IRP2010 funding ("REBID Phase 2") initiatives

- Strategic Framework for the optimal allocation of wind farms fine tuned e.g. integration of Wind Atlas WASA wind resource layer into national wind resource planning

- Capacity Credit study updated with WASA wind data

- Wind Power prediction investigation

- Support implementation of Revised RE White Paper policy and target for wind beyond 2013

- Wind turbine and components testing and certification capacity and infrastructure investigation and support

- Ongoing Awareness campaign, dialogue, education (Government, public, private sector etc)

- Support Wind Industrial Strategy development/implementation

- Support Wind Energy Education and Training initiatives (SAWEC etc).

Key lessons learnt include the following:

- *Catalytic impact:* SAWEP provided key necessary information, knowledge, tools, and capacities for an enabling wind sector environment; however, as always, the catalytic impact is highly sensitive to the high-level decision makers and here SAWEP in come instance

was highly successful (e.g. in including relevant Ministers on several occasions), in others not so (e.g. in getting involved in the key decision making processes leading to e.g. REFIT, PPA, etc.). *Lesson learned (process):* Programme management (project manager, PMU, donor, etc.) has to keep trying to get key high-level decision makers on board, some times it succeeds, some times not, but that is not the key issue, the key is the continuous attempts with the multiple different techniques such attempts can use (inclusion in seminars, work groups, technical questions, working more closely together on e.g. less political issues, etc). SAWEP programme management did throughout project implementation continue to push for high-level inclusion

- *Delivery of direct and indirect benefits:* The direct benefits to the private wind sector stakeholders come mainly from private sector investments and governmental incentive schemes, e.g. REFIT. SAWEP has little influence on these direct benefits, and might even, if as planned for the SAWEP through direct feasibility support to individual wind developers, become entangled in situations and games of who to benefit, who not. *Lessons learned (design)*: Project design has to carefully consider the type of programme to be implemented, direct or indirect support to key private sector stakeholders, and should not mix these into one project as professionalism on both issues might suffer. The programme, correctly, choose to only support the wind industry indirectly through TA, removal of barriers, etc.

- *Adaptive Management:* The management of SAWEP effectively adapted to the needs and circumstances as they were expressed during implementation. Therefore, the actual project implementation indeed differed substantially from the initial design, but the actual intended impact remained similar. *Lessons learned (process)*: The dynamics of the project's environment shall always be considered and flexibility for adaptive management granted. UNDP and DoE provided the platform for these necessary adjustments during project implementation. *Lessons learned (design)*: The overall aim of the project remained valid, but the overall objectives (CO2 reduction, number of MW installed, etc.) did not, and this provides for potential misunderstandings and dangers (e.g. as the outcomes were not reformulated, could this evaluation have rates the project very low!). One lesson learned here is that outcomes should have been reformulated. Another is that the outcomes formulated in the design phase were highly unrealistic and

impractical as they did not link (LFA-wise) to actual planned, outputs, activities and inputs

- *Choice of Project Manager:* Selecting the right project manager is invaluable for the project's success. Both the SAWEP project manager, and the flexible functioning of the PMU, contributed to the creation of mutual confidence between the manager, the executing partners, and the many wind sector stakeholders providing the ground for impact and relevance of outputs. *Lesson learned:* This time lucky!

- *Coordination with parallel initiatives:* Projects can be complemented substantially by other initiatives - nationally funded or funded by bi-lateral/multilateral aid - even if they are not properly identified at the project design. This certainly was one to the main achievements of SAWEP, the effective coordination with numerous key stakeholders on many different levels (national, provincial, local, interdepartmental, etc.), within many different professional spheres (policy, research, private sector, financing institutions, etc.) and with many different financial and donor stakeholders, all with the aim to become lead donors / financiers to the renewable energy sector at national level. SAWEP is one of only very few international projects in South Africa that actually managed to establish successful donor co-funding during implementation. *Lesson learned (design and process):* Coordination with parallel initiatives should be attempted designed into the projects from the beginning, not being the sole responsibility of the project manager during implementation.

2 Introduction

2.1 Purpose of the evaluation

In accordance with GEF policies, all full and medium-size projects supported are subject to a final evaluation upon completion of implementation. In addition to provide an independent in-depth review of implementation progress, this type of evaluation is responsive to GEF Councils decisions on transparency and better access to information upon completion of a project.

2.2 Key issues addressed

The specific purpose of the SAWEP terminal evaluation is to assess to what degree the project objectives were achieved, in particular:

- Assess overall performance and review progress towards attaining the projects objectives and results including relevance, efficiency and effectiveness
- Review and evaluate the extent to which the project outputs and outcomes have been achieved
- Assess the extent to which the project impacts have reached or have the potential to reach the intended beneficiaries
- Critically analyse the implementation arrangements and identify strength and weaknesses in the project design and implementation
- Describe the projects adaptive management strategy
- Review the clarity of roles and responsibilities and the level of coordination between various agencies and institutions involved
- Assess the level of stakeholder involvement, including the efforts of UNDP in support of implementation
- Review donor partnership processes

- Describe key factors that will require attention in order to improve prospects for sustainability or project results achieved

- Identify and document the main successes, challenges and lessons that have emerged.

2.3 Methodology and structure of the evaluation

The methodology used for the evaluation included primarily document review and interviews with key stakeholders:

Documentation review included e.g. review of the following documents:

- Project Document and Project Appraisal Document

- Project implementation reports (PIR's)

- Quarterly progress reports and work plans of the various implementation task teams

- Audits reports

- Annual Review Reports

- M & E Operational Guidelines, monitoring reports prepared by the project

- Financial and Administration guidelines

- The project M&E framework

- Knowledge products from service providers, including all technical reports commissioned by the projects

- Project operational guidelines, manuals and systems

- Minutes of the PMU Meetings, task teams and other project management meetings

- The GEF Implementation Completion Report guidelines

- The UNDP Monitoring and Evaluation Frameworks.

Interviews with (see annex for details):

- UNDP-GEF staff with project responsibilities

- Members of the PMU

- Staff of the Project Management Unit
- Executing agencies
- Project stakeholders, particularly members of the various project level steering committees and project beneficiaries, including the private sector
- Relevant staff in participating government departments.

The SAWEP terminal evaluation is structured accorrding to the requirements of the ToR, namely:

- **Executive summary,** includes the following sub chapters: Brief description of project; Context and purpose of the evaluation; Main conclusions including rating; and Recommendations and lessons learned
- **Introduction,** includes the following sub chapters: Purpose of the evaluation**;** Key issues addressed**;** Methodology of the evaluation; and Structure of the evaluation
- **The project and its development context,** includes the following sub chapters: Project start and its duration**;** Problems addressed**;** Immediate and development objectives of the project**;** Main stakeholders; and Results expected
- **Findings and conclusions,** includes the following sub chapters: Project Formulation**;** Project Implementation; and Results to date
- **Lessons learned,** includes asessment of the following elements: Catalytic Impact**;** Delivery of Direct Benefits; Delivery of Indirect Benefits; Level of scrutiny at GEFSEC review stage; Adaptive Management; Choice of Project Manager; and Coordination with Parallel initiatives
- **Conclusions and recommendations**
- **Annexes,** includes the following sub chapters: Evaluation TORs**;** List of persons interviewed; and List of documents reviewed.

3 The project and its development context

3.1 Project start, duration and problems addressed

The project started in February 2008 and was concluded in December 2010.

The main problems to be addressed by the projects were related to the removal of barriers to wind energy development in South Africa. These barriers included regulatory and institutional barriers, financial barriers, information knowledge and capacity barriers.

3.2 Immediate and development objectives of the project

The overall aim of the GEF UNDP SAWEP Full Size Project Technical Assistance was to assist the South African Government and stakeholders in creating an enabling environment for the commercial replication of grid connected wind farms and the establishment of a vibrant and sustainable wind industry in South Africa.

The objective of the project was to install and/or prepare the development of 50.2 MW of wind power and a project total anticipated emissions reductions of 4.6 million tons of CO_2 equivalent (over 20 years). The project was intended to 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).

The SAWEP project was designed as a 5-year program to contribute to the removal of barriers for establishment of a wind industry in South Africa. The project was divided into seven main components to contribute to a first lowering of the identified barriers within a full-sized project.

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

The project was divided into six main outcomes with specific outputs and activities that should contribute towards the achievement of the project goal and objective. These outputs were:

- Increased public sector incremental cost funding
- Green power funding initialized
- Long-term policy and implementation framework for wind energy developed
- Wind resource assessment
- Commercial wind energy development promoted
- Built capacity building and strengthened institutions.

3.3 Main stakeholders

Stakeholders in the PSC consisted of the UNDP, DME, DEAT, NT and NERSA. The project worked very actively to include, integrate and coordinate the many institutions involved in the development of the wind sector in South Africa from policy (DoE, DST, DTI, NT, etc.), research (UCT, SANERI, CSIR, RISO, etc.), private sector (SAWEA, SANEA, NBI, etc.), regulation (SABS, NERSA, etc.), producers (ESKOM), to donors (RDE, GtZ, UNDP, etc). All these players were involved in SAWEP activities.

3.4 Results expected

The following outcomes (components) and outputs were expected as a result of the activities to be undertaken:

Component 1: Increased public sector incremental cost funding
Output 1.1: Detailed financial instruments to stimulate commercial wind energy developments have been designed and accepted for implementation by the Government
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
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Component 6: Built capacity building and strengthened institutions
Output 6.1: The technical capacity of the main actors involved in wind power generation has been strengthened
Output 6.2: The South African institutional capacity of the key institutions involved in renewable energy (power) development has increased
Output 6.3: The South African Wind Energy Association (SAWEA) has been strengthened and institutionalized
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
Component 7: Dissemination
Output 7.1: Monitoring, learning, adaptive feedback and evaluation

4 Findings and Conclusions

4.1 Project Formulation

*Conceptualization/design (rating 4)***.** Did the approach used in design and selection of project interventions address the root causes and principal barriers for development of the private wind sector in South Africa? Principle causes and root threats were in the design defined as barriers to wind farm development in South Africa focusing on financial, regulatory/institutional and information, knowledge and capacity and the project interventions were divided into six components in order to address these barriers: *Public sector incremental cost funding, Green power funding, Long-term policy and implementation framework for wind energy, Wind resource assessment, Commercial wind energy development and Capacity building and institutional strengthening.* In general it is found that the design and selection approach were, at the time of design, adequate, relevant and appropriate in seeking to address the barriers/root causes/principle threats described. However, the context of the project quickly after initiation changes making some the components less relevant, e.g. Green Power financing schemes such as willing-buyer willing-seller or TREC mechanisms. The project responded adequately to these changes in the external environment.

Concerning the logical framework, the some of the proposed outputs and activities responded well to the contextual settings of the project, while others, in particular the outputs relating to private sector stakeholder involvement and benefits, were either overly optimistic or did not have corresponding activities or budgets that could secure their fulfilment. In particular can the following findings be highlighted:

- Project design has to carefully consider the type of programme to be implemented, direct or indirect support to key private sector stakeholders, and should not mix these into one project as professionalism on both issues might suffer. The programme, correctly, choose to only support the wind industry indirectly through TA, removal of barriers, etc.

- The management of SAWEP effectively adapted to the needs and circumstances as they were expressed during implementation. Therefore, the actual project implementation indeed differed substantially from the initial design, but the actual intended impact remained similar.

The overall aim of the project remained valid, but the overall objectives (CO2 reduction, number of MW installed, etc.) did not, and this provides for potential misunderstandings and dangers. One lesson learned here is that outcomes should have been reformulated. Another is that the outcomes formulated in the design phase were highly unrealistic and impractical as they did not link (LFA-wise) to actual planned, outputs, activities and inputs.

Indicators for guiding implementation and measurement of achievement were defined in SAWEP Annual Work Plans for 2008, 2009, 2010. These indictors were, like for most other donor projects, kept at a very high abstraction level and were, in practice, non-measurable.

Country-ownership/driveness (rating HS). The project idea/conceptualization clearly had its origin within national, sectoral and development plans and focused on national environment and development interests. In this regard, the project was very well anchored in the local context and local priorities. The national government, primarily DoE, was actively involved in project design and formulation. The South African Wind Energy Programme (SAWEP) project document was approved by the GEF on 30 May 2007. The DME Director General signed on 11 July 2007 the DG Submission 2007/5114 in which the DME Director General approved the SAWEP project. The SAWEP project GEF grant of US$2 million is hosted and is, as per DME/UNDP MoU, administered by the UNDP, which include UNDP support services regarding Financial Management and Accountability. A SAWEP Project Steering Committee which was approved by the DME Director General (DG Submission 2008/8975) and comprising DME (Chair), UNDP, DEAT, Treasury and NERSA officials, guide and advise the project's implementation in direct consultation with the DME, SAWEP Project Management Unit and UNDP.

The project idea/conceptualization is therefore seen to have had a strong sense of local ownership for the following reasons:

- SAWEP originated from the declaration by the Minister of Minerals and Energy in June 2000 of the Darling Wind Farm as a National Demonstration Project and her request for international assistance in particular from GEF and Danish Embassy

- 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. The project was well aligned to these national objectives

- More recently the government of South Africa has demonstrated its commitment to renewable energy for the production of modern energy carriers that will offer a sustainable commercial alternative to fossil fuels. Significant progress has been made regarding the recognition of renewable energy into the legal and regulatory framework.

Stakeholder participation (rating HS). Consultation, and "stakeholder" participation in design stages were undertaken to an appropriate level. Due to the then Minister of Energy requesting international assistance for the Darling National Demonstration Project, close consultation between the then DME and UNDP were undertaken in order to in seek approvals for project implementation. This culminated in an MOU signed between the UNDP and DME. Following this, an inception workshop was held with a broad representation of stakeholders present with the following objectives;

- To introduce the project to various stakeholders
- To deliberate relevant project challenges
- To develop an annual work plan on the basis of the project's logical framework analysis that seeks to respond to the above challenges
- To establish project implementation and management structures.

This seminar, together with a number of informal meetings and consultations with key stakeholders, result in the finding that information dissemination, consultation and stakeholder participation was carried out appropriately during design stages.

Replication approach. A number of lessons and experiences coming out of the SAWEP project were replicated or scaled up in the implementation of other projects and provided feed-back into providing leverage to the impact of the SAWEP project.

Projects can be complemented substantially by other initiatives - nationally funded or funded by bilateral/multilateral aid - even if they are not properly identified at the project design. This certainly was one to the main achievements of SAWEP, the effective coordination with numerous key stakeholders on many different levels (national, provincial, local, interdepartmental, etc.), within many different professional spheres (policy, research, private sector, financing institutions, etc.) and with many different financial and donor stakeholders, all with the aim to become lead donors / financiers to the renewable energy sector at national level. SAWEP is one of only very few international projects in South Africa that actually managed to establish successful donor co-funding during implementation. Coordination with parallel initiatives should be attempted designed into the projects from the beginning, not being the sole responsibility of the project manager during implementation.

SAWEP provided key necessary information, knowledge, tools, and capacities for an enabling wind sector environment; however, as always, the catalytic impact is highly sensitive to the high-level decision makers and here SAWEP in come instance was highly successful (e.g. in including relevant Ministers on several occasions), in others not so (e.g. in getting involved in the key decision making processes leading to e.g. REFIT, PPA, etc.). Programme management (project manager, PMU, donor, etc.) has to keep trying

to get key high-level decision makers on board, some times it succeeds, some times not, but that is not the key issue, the key is the continuous attempts with the multiple different techniques such attempts can use (inclusion in seminars, work groups, technical questions, working more closely together on e.g. less political issues, etc). SAWEP programme management did throughout project implementation continue to push for high-level inclusion. However, this aspect was not adequately designed into the project from the beginning. For projects that seek to have a catalytic impact, recognition of the role of high-level decision makers must be made already in the design phase.

Linkages between the project and other interventions within the sector and the definition of clear and appropriate management arrangements were to some extent undertaken at the design stage. The following linkages with other sector interventions were identified at the design stage:

- Renewable Energy Market Transformation (REMT)
- NERSA RE regulatory framework development
- RE White Paper review
- Wind Power Capacity Credit Report
- Grid Integration of Wind Energy in the Western Cape Report.

Considering the content of the project (private sector wind development), the project addressed directly ad indirectly UNDP priorities (gender, south-south cooperation, poverty-environment linkages (sustainable livelihoods) and disaster prevention and recovery). The project directly or indirectly sought to address the following cross cutting UNDP issues:

- Sustainable livelihoods
- Frameworks and strategies for sustainable development
- Access to sustainable energy services
- Capacity development.

4.2 Project Implementation

Implementation approach (rating S). Implementation can be assessed in relation to a number of aspects. In the following implementation will be assessed against (i) the use of the LFA, (ii) adaptive management, (iii) use of IT, (iv) institutional management arrangement, (v) technical capacities utilised, (vi) monitoring and evaluation, (vii) stakeholders participation and information disseminations, (viii) financial management, (ix) co-funding, and (x) procurement and work / budget planning. Each of these ten assessment areas are discussed and covered below.

The *logical framework* was only sporadically used as a management tool during implementation, which can be seen in the extent to which components and outputs were re-assessed and re-prioritised without the LFA framework being changed. On the other hand, it can be noted that the logical framework was sufficient flexible and adaptive in that each of the 6 outcomes was kept and still being used for tangible monitoring and evaluation of progress towards the project's stated overall goal and objective. The logical framework analysis (LFA) formed the basis of the annual work plan (AWP). Implementation required the annual work plan to be broken down to project-specific level with critical paths and combining of outputs where applicable. The party responsible for meeting the outputs of the work plan was the DME as the Executing Agency with day to day tasks overseen by the Project Management Unit.

The management of SAWEP effectively *adapted* to the needs and circumstances as they were expressed during implementation. Therefore, the actual project implementation indeed differed substantially from the initial design, but the actual intended impact remained similar. UNDP and DoE provided the platform for these necessary adjustments during project implementation. Also the composition of the PSC comprising of key and influential government departments (National Treasury, Environmental Affairs and Tourism) and organisations (UNDP/GEF, NERSA) with no commercial and/or contractual interests in the project other than to assist (UNDP GEF funding, UNDP, DME MoU, approving of ToRs, and awarding of contracts) the DME in the execution of the project supported the flexible and adaptive approach of the project.

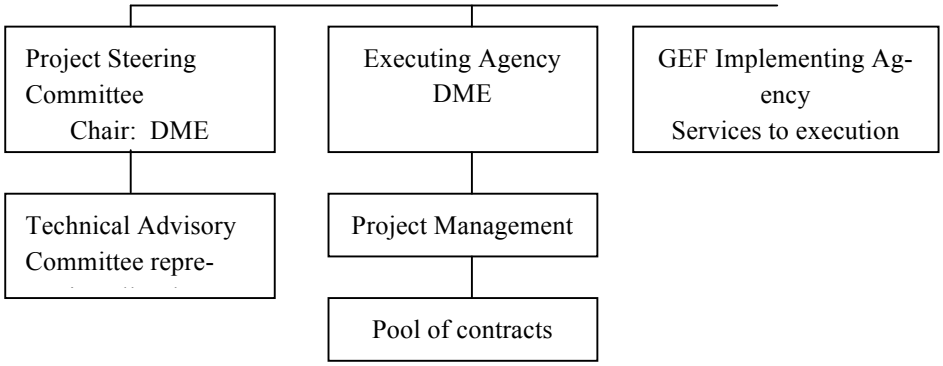
The overall aim of the project remained valid, but the overall objectives (CO2 reduction, number of MW installed, etc.) did not, and this provides for potential misunderstandings and dangers. One lesson learned here is that outcomes should have been reformulated. Another is that the outcomes formulated in the design phase were highly unrealistic and impractical as they did not link (LFA-wise) to actual planned, outputs, activities and inputs.

The project did rudimentary use *electronic information technologies* to support implementation, participation and monitoring, as well as other project activities. E.g. it can be noted that the results of the project still have not been uploaded to the DoE website.

On the other hand, did the project take a very pro-open approach to data sharing and open access to public information, e.g. in relation to making wind data open accessible - http://www.wasa.csir.co.za - and displaying websites at the launch by DoE Minister at 2nd Annual Wind Energy Seminar, 28 September. The wind data website currently has impressive 237 users from all over the world, and has had 6246 downloads since its launch in September 2010. For a very specialised site this is very important and impressive data.

The project applied standard *operational approaches* to creating relationships between the institutions involved, e.g. PSC, seminars, work groups, etc., see diagram below. It is assessed that these approaches sufficiently create effective

relationships for effective implementation and achievement of project objectives.



The PSC established a project advisory committee (PAC) that at times functioned as a platform to present and share ideas as well as to solicit specific inputs from its members who came from different sections within the wind project development community (such as Eskom, municipalities, SAWEA academic, finance, consulting engineers, NGOs, and project developers/owners). This arrangement contributed to creating transparency at the national level.

As Executing Agency DME was 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. DME in general performed the functions as Executing Agency satisfactory.

A Project Management Unit (PMU) was created. The PMU provided secretariat, coordination and overall management functions and tasks related to the different outputs. The PM was in charge and responsible for the following:

- To prepare 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
- To prepare Terms of References and the subsequent identification and contracting of subcontracting personnel and organisations
- To organise and implement physical office facilities for the project at the DME offices in Pretoria
- To finalise Terms of References for sub-contracting consultants

- 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 UNDP, and the DME)

- To supervise, coordinate and facilitate the work of the national and international consultants retained for the different activities to be implemented

- To keep the PSC fully informed of the progress of the project

- 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 coordinate all the activities carried out under the project

- To inform the PSC about significant variations in the programmed budget

- To prepare and participate in the PSC meetings and carry out a follow up on the outcomes of such meetings

- To ensure that all procurement and external communications activities are fully within the standard procedures and knowledge of the UNDP and DME systems and key personnel, with exceptions only in writing in advance of expenditure or external communication

- To adhere to UNDP Procurement Rules

- To do all possible to make the project successful and deliver within the prescribed time frame and budget

- To make sure that the project can successfully transfer into a sustainable phase of implementation.

Again, based on interviews and document review, it is assessed that the PSC and the secretariat in general performed all of the above functions satisfactory.

It is assessed that there has been adequate *periodic monitoring and evaluation oversight of activities* during implementation to establish the extent to which inputs, work schedules, other required actions and outputs are proceeding according to plan (rating 5). The project was monitored and evaluated according to standard UNDP rules for nationally executed (NEX) projects. The PMU, under direct responsibility of the project coordinator, elaborated and provided key monitoring and evaluation documentation. The PMU was responsible for continuous updating and reporting of financial and progress information. Specifically, a six monthly review and reporting cycle were established with

the delivery of performance reports consisting of financial and progress reports, as well as proposals for updated work plans. The table below details meetings and workshops held with regards to monitoring and evaluation.

Type	Date	Purpose
Inception Workshop	March 2008	Introduce project to stakeholders
1st PSC	May 2008	Approve ToRs, AWPs
2nd PSC	October 2008	Approve ToRs, reporting back
3rd PSC	August 2009	Progress reporting, approve ToRs
4th PSC	March 2010	SAWEP Phase 1 progress report
5th PSC	October 2010	SAWEP Phase 1 final report

In addition, the PMU prepared and presented an Annual Report for the period June 2008- June 2009 and June 2009 to June 2010. This report included evaluations on progress towards meeting objective (DOrating) and a rating, progress in project implementation during reporting period (IPrating) and a rating, project metrics for climate change indicators, adjustments to project strategy as well as finance and procurement issues. It was through the Annual Report that actions to be taken based on formal evaluations was recorded (DOAction Plan, IPAction Plan, Risk Management Response, Adjustments to Project Strategy and Time Frame).

The main method for *stakeholder participation* (rating HS) was participation in meetings, committees, workshops and seminars and the main method of *information dissemination* was via reporting.

Stakeholder participation was undertaken through a number of different methods applied during project implementation. The establishment of partnerships and collaborative relationships developed by the project with local, national and international entities and the effects they have had on project implementation, significantly contribution to active stakeholder participation. The effect of collaboration and partnership with numerous entities has certainly had a positive impact on project implementation and outputs. During the project duration, intensive partnerships were established with e.g. GTZ, The Danish Embassy, SANERI, Riso, CSIR, UCT, and SAWS amongst others.

Involvement of governmental institutions in project implementation, and the extent of governmental support of the project, was another element highlighting the active participation of key stakeholders in the project. Government support was strong throughout the project life. The DME was the executing agency with its staff seconded to the PMU unit. Other key government institutions sat on the PSC, comprised of the DME, DEAT, NERSA, NT and the UNDP. One of the lessons learnt was that such strong anchoring involving high-level decision makers was critical for the SAWEP project success. Government also marshalled financial resources for the project. SA Government through CEF, the Danish Embassy, and DBSA provided substantial co-financing for the implementation of project outputs and activities.

Information dissemination happened mainly through reports detailing the outputs achieved under the 6 first outcome categories. Reports and studies published included amongst others:

- Domain Protocol for Voluntary Tradable Renewable Energy Certificate System final report
- South African Renewable Energy Sectoral Business Case study and report
- Investigation into the Development of a Wind Energy Industrial Strategy for South Africa final report
- Wind data display and download websites launched
- Impact of Wind Generation in South Africa on Capacity Planning
- Impact of Wind Energy in South Africa on System Operation.

Another frequently used method of information dissemination was through seminars and workshops, which allowed for an element of stakeholder participation in the project. Seminar and workshops convened included:

- SAWEA workshops
- Standardisation workshops
- Wind Atlas workshops
- Industrial Strategy workshops
- Annual National Wind Seminar.

More than one thousand key stakeholders participated in the above listed workshops and seminars. In general the SAWEP seminars and workshops were very well attended (e.g. more than 300 to the first Annual Wind seminar), indicating a great interest in the topic covered and appropriate timing of the workshops and seminars.

NGOs did not directly take part in project execution, nor were any project implementers or subcontractors. The approach adopted was to give the task of executing agency to the DME, within which the PMU would sit. The technical outputs of the project required specialist capabilities and skills. Technical private sector local resources were contracted, e.g. for the development of SAWEA business plan. These local resources were contracted through the issuing of TORs – approved by PSC – and the subsequent procurement process this entailed.

Financial Planning and Budget allocation. The project followed closely UNDP guidelines for financial planning, monitoring and reporting, and it is assessed by the evaluation team that the project in general was appropriately financial monitored by the PSC and the UNDP representatives. Allocations and re-allocation was clearly and transparently documented through open decision making processes at the PSC meetings. Disbursement happened timely. Throughout the project life, sound financial accounting and auditing methods were made use of. These included a detailed expenditure atlas, combined delivery reports, audits for the 2008/9 and 2009/20 financial years, annual reports and annual work plans as well as an asset register.

Regarding the actual project cost by objectives, outputs, and activities it is assessed that the approved reallocations clearly down-prioritised certain outcomes, while others were resource and financially up prioritized. It is not possible to allocate all budget utilised directly to each component and outputs, but below is provided an assessment of budget allocation per outputs.

The table shows that of the 13 outputs were 7 outputs not allocated budgets, 3 outputs allocated a minor amount of around 0,05-0,1 mill USD, while 2 outputs were allocated almost 2.0 mill USD (the passive Green Fund Guarantee, 0,5 mill USD and the active wind measurement mapping output, 1.4 mill USD). The remaining budget was utilised for project administration and management. It can be concluded that by far the main part of the budget was utilised for one output, the wind mapping output. As previously stated in the output per output assessment, several of the outputs correctly were down-prioritized during project implementation, and this had a direct influence on project budget allocation.

Components and Outputs	Overview financial utilisation
Component 1: Increased public sector incremental cost funding	
Output 1.1: Detailed financial instruments to stimulate commercial wind energy developments have been designed and accepted for implementation by the Government	Ca 0,05 millUSD

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	Ca 0.56 millUSD (some still un-spent)
Output 2.2: Green power marketing activities for selected urban centres are designed and actively supported by UNDP/GEF	No budget utilised
Output 2.3: A system for Tradable Renewable Energy Certificates (TREC) has been designed, set-up and under implementation	Ca 0,1 millUSD
Component 3: Long-term policy & 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	Ca 0,05 millUSD
Component 4: Wind resource assessment	
Output 4.1: Wind measurements and monitoring at 20 sites has been supported	By far the largest part of the budget, ca 1.4 mill USD
Output 4.2: Up to ten private developers have been assisted with their wind measurements for sites identified for commercial wind farm developments	Linked to 4.1, no budget
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	No budget utilised
Component 6: Built capacity building and strengthened institutions	
Output 6.1: The technical capacity of the main actors involved in wind power generation has been strengthened	No budget utilised
Output 6.2: The South African institutional capacity of	No budget

the key institutions involved in renewable energy (power) development has increased	utilised
Output 6.3: The South African Wind Energy Association (SAWEA) has been strengthened and institutionalized	No budget utilised
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	Minor budget utilised
Component 7: Internal dissemination	
Output 7.1: Monitoring, learning, adaptive feedback and evaluation	Remaining budget utilised, ca 0,3 millUSD

The cost-effectiveness of achievements therefore mainly relates to the utilisation of the funds for the wind mapping output. This output was co-funding by almost 2.5 mill USD by the Danish Embassy (70% of the total wind mapping output), and strict coordinated controls were established for budget allocation, reporting and monitoring of the many professionals research partners involved in execution of the wind map. The wind map costs were compared in the design with similar costs for national wind maps developed for China and Egypt, and the costs for the South African wind map was kept within comparable cost levels. The conclusion reached based on an examination of available reports and evidence is that the project outputs were implemented cost-effective and that there was no evidence of financial maladministration.

Co-financing was utilized and has proven successful. Institutions that provided co-finance included the Royal Danish Embassy, Danida, GTZ and in kind funding by the South African Government. The table below details the sources and amount of co-funding, which is assessed substantial and positively exceptional for a project of SAWEP size.

N	Source	Amount (ZAR)
1	South African Government	1,540,000.00
2	Royal Danish Embassy - Windmapping	17,100,000.00
3	Royal Danish Embassy – National business case	500,000.00
4	Royal Danish Embassy – wind industry strategy	650,000.00

Regarding GTZ funding, the activities undertaken were not part in parcel of the activities and outputs of the project yet nonetheless had the same overarching objectives in mind, hence the alignment of resources and outputs.

No issues were encountered regarding *procurement management.* Government and UNDP guidelines were strictly adhered to. The same is the case for the *linkages between work programming, procurement planning, budgeting, and disbursement planning*, where the UNDP Project Document PIMS 1637 set out the project objective, outputs and activities as well as an indicative total budget and work plan, followed by the next level of planning through the Annual Work Plans. These consisted of Outputs (costed) measured against Objectively Verifiable Indicators. Matching the Annual Work Plans were Annual work Plan budgets, which included Key Activities with Timeframes, Responsible Parties as well as the Planned Budget with a Budget Description, the Amount and Donor. Procurement and disbursement planning followed these planning documents in meeting budget allocations and time frames within which to procure certain services. Overall, it is assessed that the linkages between work programming, procurement planning, budgeting and disbursement planning was satisfactory undertaken and utilised as planned during project implementation. The effectiveness of procurement management is also indicated by positive results of audits (internal and/or external) and the reports of the review / supervision missions.

4.3 Results to date

It can in general be concluded that the outcomes of the project has been satisfactory with significant and impressive achievements recorded for several key target outcomes, while satisfactory achievements, taking the fluctuating political context of the project in consideration, has been reached for the remaining outcomes. The signing of PAA and purchase of green electricity from Darling to Cape Town since May 2008 was a positive achievement, as were project activities in the areas of capacity building of local wind stakeholders and the design, implementation and monitoring of the comprehensive national wind resource assessment study. In general did the project contribute significantly to the increased attention to renewable energy, in particular wind energy, in South Africa during the project period. An attention that in August 2011 resulted in the governmental tendering of almost 2,000 MW of wind energy to the private independent power producer sector.

The project focused its efforts in the following five outputs: (i) Development of Wind Atlas (Output 4.1 with highly increased budget through the reallocation of funds from other outputs); (ii) Design and support of the guarantee scheme for the Darling Wind Plant – City of Cape Town PPA (outputs 2.1 and 2.3), (iii) Investigation into the development of a Wind Industrial Strategy for South Africa (relevant to output 3.1), and to a lesser extent: (iv) Development of business plan for SAWEA (relevant to output 6.3) and (v) Monitoring, learning, adaptive feedback and evaluation (output 7.1). The remaining outputs received less attention during the project period, due to, in the opinion of the evaluation team, a correct reprioritization of the project's

objectives, outputs and activities during project implementation. It has to be recognised that, parallel to the project, numerous other national initiatives, funded by the government and bilateral donors, produced significant impacts and results that complement the activities of the SAWEP.

The 50 MW target was in many ways an over-ambitious goal and only poorly linked to planned outputs and activities of the project, why the failure to reach this target is not deemed critical by the evaluation team. The target should more be seen as a formulated objective very early in the programming process, around 2003, and then not subsequently changed when the phase one of the SAWEP was initiated in 2008.

During project implementation, SAWEP continued to play a highly visible, influential and critical visible role in catalyzing public interest in wind energy in South Africa and assisted the national governmental departments such as DoE, DTI, DST, National Treasury, NERSA and Eskom with provision of relevant and required regulatory and implementation frameworks needed for investment in the sector. SAWEP was included as a success case in the UN report on Climate Finance - Spending Wisely.

GEF disbursements proceeding as planned, and budgets were flexible and appropriately reallocated between the different outputs during project implementation, in order to reflect the actual priorities of the executing agency (Department of Energy – DoE). The SAWEP PMU has generally done a good job managing the project and developing strong relationships among project stakeholders. The SAWEP project manager has been instrumental and actively involved in representing the DoE in the coordination of parallel renewable energy initiatives. In that manner, he very effectively acted as an information hub on behalf of the DoE and secured that those initiatives have been complementary to the SAWEP. He has furthermore actively and successfully secured donor coordination within the sector, for example through successfully creating co-funding with the Danish Embassy on several projects and TA coordination with the German GtZ thereby substantially levering the impact and scope of the UNDP project.

Based on review of the available information, stakeholder interviews and consultation and analysis of output – input correlations, the conclusion is that the project has been a success. In particular significant achievements has been reached on:

- The carrying out of wind resource assessments
- The promotion of commercial wind energy development
- The strengthening of institutional capacity at the national level
- Internal coordination and focus at DoE regarding renewable energy and wind energy in particular

- Donor coordination and leverage of programme outcomes through co-funding.

The overall results and impacts of the SAWEP project have to be labelled *sustainable* in a national South African context. Renewable energy and in particular wind energy has received substantial attention and has seen tremendous progress during the last three years in South Africa. New policies have been drafted, specific renewable targets have been set, e.g in the IRP, policies and targets have been set for carbon reductions, South Africa will host the COP17 negotiations, national news and media covers the area intensively and positively and places substantial pressure on the decision making levels within climate change and renewable energy. Added to all these developments favouring the impact of the SAWEP project, has the Government in June 2011 tendered 3750 MW of renewable energy projects to the private sector, which follows directly the objectives and intention of the SAWEP project.

The exact degree to which SAWEP has contributed to these overall developments is naturally not possible to determine, but a clear parallel can be seen between the objectives, outputs and activities of the SAWEP programme and the development direction the country has taken the last years regarding renewable energy including wind energy and the focus on involving the private sector in the development. It is assessed that the overall impact and benefits of the SAWEP will continue in the coming years. Specifically, it can be noted that some of the key impact areas of the project, in particular *the wind mapping output and the capacity building on the national level*, will need to have continued strong focus in the coming years, not because their importance will diminish, but because they will require even more attention and up-grading. The wind map will need to implemented, disseminated and utilised at national and provincial levels for planning purposes in full, and this will require increased staff capacity and funding. The national capacity to implement and monitor e.g. the large tendering of renewable energy will need to be strengthened. A specific unit for IPP will have be created and staffed with new capacitated renewable energy experts.

Below is provided summary conclusions for the outcomes (components) and outputs of the projects. Each outcome and output furthermore has been rated utilising the UNDP rating format.

Components and Outputs	Summary conclusions	Rating
Component 1: Increased public sector incremental cost funding	Public funding was made avaliable at the end of the project period. The project achievements and activities can indirectly be linked to this result	S
Output 1.1: Detailed financial instruments	The project assisted the Government of South Africa with detailing the most appropriate	S

to stimulate commercial wind energy developments have been designed and accepted for implementation by the Government	financial instruments that should be made available to stimulate commercial wind energy developments; e.g. did the project, in cooperation and co-funded with the Danish Embassy (good example of donor coordination), prepared a National Business Case for Renewable Energy report, which provided a relevant input to the ongoing debate and dicsussion on which instruments to utilise. SAWEP was furthermore a member of NERSA REFIT Advisory Committee, NERSA announced (March 2009) REFIT (wind R1.25/kWh). Ca 0,05 millUSD from the project was utilised for this output	
Component 2: Green power funding initialised	The project played an active and direct role in creating substantial focus on green power funding, but the model was not replicated as the REFIT model took preceedence in the country	S
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	The project assisted several initiatives geared towards green power marketing and setting up and implementing Tradable Renewable Energy Certificates (TRECs). The key initiative was the provision of an innovative green power guarantee scheme developed under the PDF B; City of Cape Town Green Power Guarantee Scheme hosting agreement signed by DoE and DBSA, USD560,000 transferred from SAWEP to DBSA account. City of Cape Town started to sell in April 2010 green certificates (1% of 14 GWh green power bought by Sept 2010). A Green PPA was established with Cape Town Municipality that did not require the scheme to be activated. Funding was reallocated mainly to the wind atlas output, and some still remain un-spent The project furthermore supported the finalisation of DoE - CCT agreements and the establishment of a final draft Domain Protocol for Voluntary Tradable Renewable Energy Certificate System final report.	S
Output 2.2: Green power marketing activities for selected urban centres are designed and actively	The project manager very early correctly assessed the reduced potential for green power schemes in the country as the premium can not compete with the REFIT tariffs, and therefore only few marketing activities were	MS

supported by UNDP/GEF	undertaken	
Output 2.3: A system for Tradable Renewable Energy Certificates (TREC) has been designed, set-up and under implementation	A draft TREC protocol was developed and funded by project (0,1 millUSD) The development of the protocol was undertaken in an effective and inclusive manner with all relevant stakeholders involved. The protocol is ready for use, if the need should arise in the future	MS
Component 3: Long-term policy & implementation framework for wind energy developed	Important and key national policies was developed during the project period with direct and indirect support from the project	S
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	The project was actively involved in the development of five key policy papers: (i) South African Renewable Energy Sectoral Business Case study and report (funded by Danish Embassy) (see output 1.1.), (ii) Investigation into the Development of a Wind Energy Industrial Strategy for South Africa final report submitted Wind Energy generation is recognized in DTI IPAP2 (co-funded and managed with the Danish Embassy – ca. 0,05 millUSD), (iii) SAWEP became a member of the White Paper on Renewable Energy Review committee securing the final draft Revised White Paper on Renewable Energy report delivered, (iv) Coordinating with DoE, DAFF and wind industry comments on DAFF draft Wind Farming guidelines v1; and (v) Coordinating with DoE, DAFF, DEA and Eskom regarding DEA study: Development of a Strategic Environmental Framework for the optimal allocation of wind farms. The project manager actively was particiting in internal and external fora for discussion of policy development. The project was indirectly involved in the development of other key policies developed in the projecg period (the REFIT, IRP, PPA, Grid Codes, Connection Codes, National Treasury regulations, etc.)	S
Component 4: Wind resource assessment	The project prepared the first professional wind map for South Africa, utilising the latest technology in the field. This wind map is of great use for private sector developers and the	HS

	national and provincial renewable energy planning sector. The map was made public available	
Output 4.1: Wind measurements and monitoring at 20 sites has been supported	A comprehensive national wind map has been developed, co-funded with the Danish Embassy, and in close cooperation with a large group national and international wind research insitutions and experts (SANERI Executing partner, Implementation partners: Riso, CSIR, UCT, SAWS), cover Western Cape and areas of Northern and Eastern Cape. The map is the first wind map for South Africa, developed according to the latest methodologies (meso-mapping) and present a large step forward for the industry and the national level renewable energy planning efforts. By far the largest part of the budget, ca 1.4 mill USD, was utilised for this outputby assisting interested public and private sectors entities with the generation of reliable wind energy data and other necessary information for wind energy development. The project played a crucial role in the development of the Wind Atlas project document (for reference see http://aonrg.com/Wind Atlas doc.pdf). SAWEP funding R6.8 million, co-financing leveraged from Danish Embassy DKK9.9 million. Preliminary meso scale wind atlas (mean wind speed at 50 m, 5 km resolution) presented at Wind Atlas Workshop, 4 March 2010. 10 Wind measurement masts installed and operational. Wind data display and download websites launched by DoE Minister at 2nd Annual Wind Energy Seminar, 28 September 2010 (for reference see http://www.wasa.csir.co.za and http://wasadata.csir.co.za/wasa1/WASAData - currently 237 users all over the world, 6246 downloads since launch Sept 2010). The 1st Wind Atlas and database to be completed by end of 2011, beginning of 2012.	HS
Output 4.2: Up to ten private developers have been assisted with their wind measurements for sites identified for commercial wind	The wind map is a common good available to all, and of high value also for private developers in site selection and downscaling meso data to micro level data. Linked to 4.1. is training and knowledge sharing with all wind private sector developers in South	S

farm developments	Africa	
Component 5: Commercial wind energy development promoted	Commmercial wind development was corrrectly promoted generally (through a wide number of activities, from policies, barriers, studies, wind data, seminars, knowledge dissemination, etc.) and not in relation to individual developers (as first planned)	S
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	Sawep undertook a number of activities in relation to this outputs, including (i) support to GTZ funded grid study which lead to the important finding that "the general feasibility of the integration of up to 2800 MW of wind generation in the Western Cape demonstrated", (ii) support to Wind Energy Capacity Credit studies: Coordinated DoE, Eskom, GTZ cooperation agreement (GTZ funded); (iii) 2 studies undertaken: Impact of Wind Generation in South Africa on Capacity Planning; Impact of Wind Energy in South Africa on System Operation Scenarios': 2015: 2 GW, 2020: 4.8 GW (low), 2020: 10 GW (high), (IV) Participate in the Wind Energy Capacity Credit study workshop (1&2 Nov) and public presentation 3 Nov 2010, Results: Capacity credit of wind farms is considerable 2 – 10 GW (22 – 26%), 25 GW (17.6%); Main impact on system operation will result from the limited predictability of wind speeds and not from absolute wind speed variations, (vi) Supported the updating of the SA Grid Code to provide for wind turbine connection. Published by NERSA; (vii) Supported the establishment of the SABS Wind Turbine and Components Technical Working Committee. 25 IEC standards were adopted and submitted to SABS TC 69 Working Committee. SABS is busy publishing it as SABS SANS standards. It was, correctly, early found that the project should not support individual developers with feasibility studes, due to the introduction of the REFIT programme, the availability of many developers in finding own sources, and the availability of similar funding mechnisms from e.g. World Bank, DBSA, etc. Instead developers have been supported on a general level through removal of barriers, access to the wind map results, etc., see (i) – (vii) above. No budget utilised	S

	for this output	
Component 6: Built capacity building and strengthened institutions	Capacity was clearly built and strengthened at the national level and between the numorous key stakholders involved in pushing the wind industry forward during the project implementation phase. Less focus was placed on individual wind industrial project developers	HS
Output 6.1: The technical capacity of the main actors involved in wind power generation has been strengthened	A number of activities were undertaken including (i) Workshops conducted (SAWEA, Standards, Wind Atlas, Industrial Strategy), (ii) Presentations delivered e.g. African Utility Week, Durban, 22-25 Feb 2010; (iii) Coordinate 2nd Annual Wind Energy Seminar; (iv) Participating in SAWEC training & education initiative, (v) Coordinate local meetings and participate in GEF Climate Change mission (SAWEP selected as 1st pilot project); (vi) SAWEP Phase 1 is one of 5 case studies mentioned in the Report of the Secretary-General's High-level Advisory Group on Climate Change Financing, Nov 2010; and (vii) Supporting Wind Awareness campaign funded by Danish Embassy. A substantial number of key actors were through these activies involved in technical capacity building activities, no plan or budget, however, was prepared or utilised, providing for an ad hoc implementation of the output	S
Output 6.2: The South African institutional capacity of the key institutions involved in renewable energy (power) development has increased	The project worked actively to include, integrate and coordinate the many institutions involved in the development of the wind sector in South Africa from policy (DoE, DST, DTI, NT, etc.), research (UCT, SANERI, CSIR, RISO, etc.), private sector (SAWEA, SANEA, NBI, etc.), regulation (SABS, NERSA, etc.), producers (ESKOM), to donors (RDE, GtZ, UNDP, etc). All these players were involved in SAWEP activities (SAWEP became a brand name in the sector!). This huge coordination work undoubtly increased the national capacity to develop and promote the wind sector in the country	HS
Output 6.3: The South African Wind	A number of interactions were made with SAWEA, and a draft business case was	S

Energy Association (SAWEA) has been strengthened and institutionalized	prepared. SAWEA is presently gaining momentum, and is played an increasingly strong advocacy role in South Africa for all policy matters relating to wind development. No budget utilised	
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	The lessons learned has been disseminated extensively, e.g. through the very successful yearly national Wind Seminars with Minister representation and more than 300 participants (co-funded and implemented with the Danish Embassy), through materials, workshops, work groups, participation in meetings, etc. Some minor lesson learned works, e.g. www uploading, has still to be finalised. A follow up phase also still has to be conceptionalised and formulation in cooperation with DWEA	HS
Component 7: Internal dissemination	UNDP guidelines and standards adhered to satisfactory	S
Output 7.1: Monitoring, learning, adaptive feedback and evaluation	Done according to UNDP guidelines and standards. The quality of the monitoring, reporting, etc. is satisfactory	S

Summary Table. Ratings: Highly Satisfactory (6), Satisfactory (5), Moderately Satisfactory (4), Moderately Unsatisfactory (3), Unsatisfactory (2), Highly Unsatisfactory (1)

Wind mapping output – case story details

The SAWEP Project Steering Committee, at its 1st meeting, on 27 May 2008, approved and based on outcome 4 of the SAWEP project document: *"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,* the Terms of Reference: Numerical Wind Atlas for South Africa.

The DME in 2003, with the assistance of the Danish supported capacity building project (CABEERE), undertook a review of wind atlases developed for South Africa. The review indicated that the atlases are useful in that it indicated that South Africa does have commercial exploitable wind resources. However the study further indicated that the standard method of data collection used (10 m high weather stations) in these atlases is not accurate enough for use in feasibility studies and in support of bankable projects. This is mainly due to extrapolation errors in estimating the wind speed at the wind turbine hub height which is nowadays 60 m and higher and the fact that many

of the weather stations were built around and are not accurately measuring the local wind climate. The power output (P) of a wind turbine is very sensitive on the wind speed (v): $P \propto v^3$. It is therefore very important that the wind speed is accurately measured and predicted as it has a huge impact on the wind turbine power output and thus financial viability of the project.

SANERI and the Royal Danish Embassy also indicated the urgent need for good and reliable wind data. It was therefore decided at a meeting on 12 June 2008 which was attended by DME, SAWEP, UNDP, Royal Danish Embassy, SANERI and DST, that the parties should combine resources and requested that SANERI and Riso (Technical University of Denmark: Wind Energy expert group) developed a Wind Atlas for South Africa project document which will outline the objective, scope of work, outputs seek, project partners, project administration and management modality for approval by SAWEP and the Royal Danish Embassy (RDE).

Co-funding by the Royal Danish Embassy (DKK 9 985 441.20 (R17 075 104, DKK/R = 1.71) significantly broaden the much needed scope of work and project area (Western Cape and areas of Northern and Eastern Cape) that could be financed by SAWEP funds alone.

The Wind Atlas for South Africa project document was presented and accepted at the 2nd meeting (29 October 2008) of the SAWEP Project Steering Committee.

The national government has mandated SANERI to commission, fund and direct non-nuclear research. SANERI reports to the Department of Science and Technology (DST) and the Department of Minerals and Energy (DME). SANERI established the Hub for Renewable and Sustainable Energy at the University of Stellenbosch with 3 Spokes (Solar Thermal, Solar PV and Wind (University of Stellenbosch and Cape Town). As a custodian of public interest and public funded energy research in the country, SANERI has to ensure that research and development initiatives are not duplicated but rather reinforced. SANERI was therefore the ideal partner to implement the Wind Atlas for South Africa project document, which also ensured that SANERI and its partners were capacitated to undertake similar projects of national concern.

The outputs of the Wind Atlas for South Africa were determined as:

- Numerical Wind Atlas (NWA) and database for the Western Cape Province and selected areas of the Northern Cape and Eastern Cape Provinces, including seasonal variations and resource maps prepared for introduction as GIS layer

- Micro scale resource map and database for 30-50% of the modelled areas in the three provinces

- Map and database of extreme wind climate of the modelled areas in the three provinces

- 10 High quality wind measurement masts and data collection operational
- Minimum 2 mid term and 2 end term workshops for invited participants in the application of the NWA and database
- The CSIR established as a resource centre for micro scale modelling
- The UCT established as a resource centre for meso scale modelling
- Training tools and software
- Research publications of the results of the twinning programme, incl. final book and home page publication
- Minimum 1 national wind seminar for dissemination of the results of the twinning programme
- Establishment and documentation of research cooperation between South African and International research partners.

The Wind Atlas for South Africa project outputs was made available for implementation by the public, private sector etc.

A Wind Atlas Project Steering Committee was established and comprising of DME (Chair of PSC), DST, SAWEP, SANERI, UNDP and the Royal Danish Embassy (RDE). The PSC approved any changes regarding objectives, means, organisation and budget for the twinning arrangement. The PSC shall meet at least twice a year. A Wind Atlas Project Implementation Unit (PIU) was established and comprising of one representative from each of the participating parties (UCT, CSIR, SAWS, and Riso) as well as the project coordinator (SANERI). SAWEP and RDE are invited to the PIU meetings. The PIU meet twice a year. The PIU was overall responsible for achieving the defined objectives within the budget and time frame defined.

Wind Atlas Working Groups (WG) was established for the implementation of each of the six working packages. The WGs consisted of dedicated experts from the participating partners (UCT, CSIR, SAWS, Riso). A Work Group Project Manager (WGPM) was established for each Work Group. Detailed work plans for the six work packages, appointment of qualified members of the working groups and decisions during the project implementation regarding work packages and activities was presented for approval by the PIU within the framework of the Project Description.

A Wind Atlas Project Coordinator (PC) was appointed to assist with the coordination of the PIU activities. SANERI undertook the PC role, and at the same time the Work Group Project Manager for Work Group 6.

A Reference Group (RG), comprising the SAWEP Project Advisory Committee (PAC), was established to 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, relevant national and provincial departments).

The project was funded by SAWEP, GEF R5 008 500 and the Royal Danish Embassy DKK 9 985 441.20 (R17 075 104, DKK/R = 1.71). Financial Management for funds received from SAWEP and RDE followed standard conditions for payments from these sources. Payment was undertaken be as per milestone achieved as reported through the Wind Atlas PSC meetings with an advance payment at project start. Financial support from SAWEP was allocated to the CSIR wind mapping component, which included a 5% contingency due to insecurities regarding pricing of the wind measurement stations and equipment. The Royal Danish Embassy funded the remaining components. The RDE funding also included a 5% contingency.

SANERI as the implementing partner, sub-contracted UCT, CSIR and SAWS. SANERI reported to the Wind PSC and invoiced respectively UNDP and the Royal Danish Embassy as per the project milestone achieved. Approval by the Director General of the SAWEP Executing Agency (DME) enabled SAWEP GEF funds to be utilised to co-fund SANERI as the implementing partner of the Wind Atlas for South Africa project.

The SAWEP Programme Management Unit oversaw and reported to the SAWEP Project Steering committee regarding project progress and achievement of the Wind Atlas for South Africa project outputs.

The wind mapping output, as outlined above, stress relevance and achievements in a number of key areas: (ii) Effective organisational and structural set-up, (ii) High-level approvals, (iii) Effective, simple and transparent co-funding mechanisms, (iv) Technical relevance of wind mapping, and (v) Creation of extensive networks between highly qualified national and international research institutions and between these institutions and relevant national policy and regulatory governmental departments.

5 Lessons learned

Key lessons learnt are reviewed around the following key aspects:

Catalytic impact: SAWEP provided key necessary information, knowledge, tools, and capacities for an enabling wind sector environment; however, as always, the catalytic impact is highly sensitive to the high-level decision makers and here SAWEP in come instance was highly successful (e.g. in including relevant Ministers on several occasions), in others not so (e.g. in getting involved in the key decision making processes leading to e.g. REFIT, PPA, etc.). *Lesson learned (process):* Programme management (project manager, PMU, donor, etc.) has to keep trying to get key high-level decision makers on board, some times it succeeds, some times not, but that is not the key issue, the key is the continuous attempts with the multiple different techniques such attempts can use (inclusion in seminars, work groups, technical questions, working more closely together on e.g. less political issues, etc). SAWEP programme management did throughout project implementation continue to push for high-level inclusion.

All interviews with the projects' stakeholders highlighted that the projects had significant impact for the market development; however there is a different view on how this impact was manifested. The governmental authorities (DoE, NERSA) considered that they missed information to address and evaluate sufficiently the resource potential and the interest of the private sector, so they deemed that the SAWEP project provided them with information and tools to achieve these targets. On the other hand, the private sector stakeholders recognized that the SAWEP project added to the political acceptability of the wind power, however they also believed that there was unnecessary delay in getting all requirements, policies and financial instrument in place, since the private interest preceded the deliverables of the SAWEP, i.e. the Wind Map not always affecting the potential developers since they had to procure information to select potential areas and undertake wind measurements for specific sites in order to be ready for the national tender process. Nonetheless they acknowledged that future developers would benefit greatly from the data of the national Wind Map.

Another lesson is that when a project includes the demonstration of technologies, as in the Darling Wind farm demonstration project, it is highly important to provide and secure that this national demonstration project receives continuous national priority status so as to maximize impact, visibility, operation

and maintenance, all issues that if not properly managed, may bring the demonstration project in discredit. This partly happened to the Darling wind farm project that regarding technology, ownership structure, management, operation and maintenance, and dissemination of lessons learned, wind production, etc. not fully lived up to the name – national demonstration project. In many instances, there was a missing link between the national demonstration status of the project and its executing mechanism. Too close linkage of the SAWEP project, as to some extent was envisaged in the project design, was potential dangerous. Correctly, did the PSC and PMU wisely decide during project implementation to place less attention, budget and linkages to the Darling Wind farm.

Another key lesson is that market transformation in the renewable energy sector highly depends on the key decision makers at the government level. The SAWEP projects can offer information and build capacities, but the private sector can only put investments on the ground when it get the final clearance by the government. So GEF projects can be catalytic but the transformation process also requires an extra catalyst: the commitment of the politician and high-level governmental officers to take decisions when sufficient information is presented to them.

Delivery of direct and indirect benefits: The direct benefits to the private wind sector stakeholders come mainly from private sector investments and governmental incentive schemes, e.g. REFIT. SAWEP has little influence on these direct benefits, and might even, if as planned for the SAWEP through direct feasibility support to individual wind developers, become entangled in situations and games of who to benefit, who not. *Lessons learned (design)*: Project design has to carefully consider the type of programme to be implemented, direct or indirect support to key private sector stakeholders, and should not mix these into one project as professionalism on both issues might suffer. The programme, correctly, choose to only support the wind industry indirectly through TA, removal of barriers, etc.

The original project design had identified two sources of direct benefits: The emission abatement due to the Darling wind farm, and the post-project direct emission reduction due to the pre-feasibility studies for 45MW. Only the emission abatement due to the Darling project can be linked indirectly to the project. The project did not support any pre-feasibility studies, so the post-project direct target will not be delivered.

The evaluation review made it clear that when the direct benefits are expected by private-sector investments, GEF projects are mostly not able to control their delivery, since they do not have any role in the specific investment decision-making process. In the case of the Darling wind farm, neither the SAWEP steering committee nor the PMU had any formal involvement in the governance of the project. So, in the unfortunate case of investments facing managerial or technical problems, the project had none or limited potential to take corrective action and achieve its targets. This inherent risk of the SAWEP project achieving such ‘ambitious’ impacts and objectives should be clearly accounted in the project design and formulation of objectives.

The SAWEP project indirectly supported the development of the wind energy market in the country, and in that sense it had significant indirect benefits. Nevertheless, indirect benefits are subject to the decisions of the government about the allocation of energy production rights to the potential producers, and the actual response by the investment community.

Adaptive Management: The management of SAWEP effectively adapted to the needs and circumstances as they were expressed during implementation. Therefore, the actual project implementation indeed differed substantially from the initial design, but the actual intended impact remained similar. *Lessons learned (process)*: The dynamics of the project's environment shall always be considered and flexibility for adaptive management granted. UNDP and DoE provided the platform for these necessary adjustments during project implementation. *Lessons learned (design)*: The overall aim of the project remained valid, but the overall objectives (CO2 reduction, number of MW installed, etc.) did not, and this provides for potential misunderstandings and dangers (e.g. as the outcomes were not reformulated, could this evaluation have rates the project very low!). One lesson learned here is that outcomes should have been reformulated. Another is that the outcomes formulated in the design phase were highly unrealistic and impractical as they did not link (LFA-wise) to actual planned, outputs, activities and inputs.

That actual project outputs can differ substantially from those initial designed, while the actual project impact can remain the same or similar indicates two points: One is the loose link between outputs and impact; and the other is the need of project management to adapt in the dynamic environment, as manifested by the changing needs of the key stakeholders. In the specific case of the SAWEP project, the minutes of the steering committee show that it has been flexible to modify the program of activities by removing certain activities and using their initially allocated GEF funding in order to support other activities which were considered more essential. This happened in response to the need of the government to e.g. get more information regarding the wind potential of the country, but also because the initial cost estimation for the specific activity, e.g. a professional prepared wind map, has been completely miscalculated.

Choice of Project Manager: Selecting the right project manager is invaluable for the project's success. Both the SAWEP project manager, and the flexible functioning of the PMU, contributed to the creation of mutual confidence between the manager, the executing partners, and the many wind sector stakeholders providing the ground for impact and relevance of outputs. *Lesson learned:* This time lucky!

In the specific case of the SAWEP project, the selected project manager did demonstrate skills that goes beyond the technical and managerial skills that are considered *sine qua non* to manage the project: due to his experience in working with all the project stakeholders and the confidence of the executing agency to his skills, he managed to act as the necessary active hub for interaction between the executing agency and the other stakeholders (other ministries, local administration, private developers, and industries) and thus cata-

lyze dialogue and development. It should be noted that all interviewed stakeholders praised the contribution and performance of the project manager.

A lesson could be that the selection of a committed internal project manager could enhance the level of confidence among the executing partners, and add the benefit of better understanding of local conditions. Definitely the professional skills of the candidates should be decisive for the selection of the right project manager, nevertheless the factor of personal commitment to the general objective of the project should be considered too. It often takes a bit more than professionalism, it takes passion, commitment and affection for the subject for a project manager to be a champion for the cause of the project.

Coordination with parallel initiatives: Projects can be complemented substantially by other initiatives - nationally funded or funded by bilateral/multilateral aid - even if they are not properly identified at the project design. This certainly was one to the main achievements of SAWEP, the effective coordination with numerous key stakeholders on many different levels (national, provincial, local, interdepartmental, etc.), within many different professional spheres (policy, research, private sector, financing institutions, etc.) and with many different financial and donor stakeholders, all with the aim to become lead donors / financiers to the renewable energy sector at national level. SAWEP is one of only very few international projects in South Africa that actually managed to establish successful donor co-funding during implementation. *Lesson learned (design and process):* Coordination with parallel initiatives should be attempted designed into the projects from the beginning, not being the sole responsibility of the project manager during implementation.

The GEF portfolio in South Africa is complemented by several initiatives by bilateral donors, such as GTZ and DANIDA. The Danish Embassy (previously DANIDA) e.g. co-funded a business plan on renewable energy for the DME that addresses the possibilities and future of the Renewable Energy Sector in South Africa. Further did the Danish Embassy e.g. contribute seed-funding towards the establishment of the Eastern Cape Community Wind Energy Development Association (ECCWEDA) that was established to protect vulnerable communities (landowners) in project development through community education, lobbying of relevant stakeholders for the development of wind farms, and commitment to equitable sharing of benefits. GTZ supported a Wind Capacity Credit Study for ESMAP and the DME and elaborated a Regional Regulatory Action Plan to improve the framework conditions for renewable energy. The grant financing of the Darling wind farm by DANIDA was identified at the SAWEP project design stage. The SAWEP project highlights that GEF projects can be complemented substantially by other initiatives - nationally funded or funded by bilateral/multilateral aid - even if they are not properly identified at the project design.

Level of scrutiny at GEFSEC review stage. The design of GEF projects is a process that involves GEFSEC resources at the stage of PIF and final project document review. GEFSEC comments frequently lead to project design modifications. However, the GEFSEC has no formal role during the project

implementation, where it receives limited information about the project implementation through the AMR process. When a project that has been under development for many years prior to GEF review and when it often takes years from the initial PIF to the final CEO endorsement, adjustments of the initial project idea to current developments during implementation are inevitable. In some cases the project document at the CEO Endorsement level might not reflect the actual situation, and instead be much closer to the initial design (as expressed in the PIF) in order to avoid justifying any changes. In such case, during implementation the project adapts to the actual situation in a manner that might contradicts the GEFSEC recommendations at the review stage.

Taking these considerations, which also applied to the SAWEP project, into account, the GEFSEC might further discuss what should be the right level of scrutiny and guidance at the project review stage, and whether it is possible to enforce this guidance during the project implementation. In this case, the level of scrutiny at GEFSEC review stage might need to be more flexible to accept changes, or to allow very general and vague outputs. The implications of such adjustment are complex but a better balance between design, adjustments and implementation need to be found.

Case: Report of the Secretary-General's High-level Advisory Group on Climate Change Financing 5 November 2010 - The South Africa Wind Energy Programme: meeting the rising demand for energy sustainability by leveraging private finance

The South African Wind Energy Programme is a multi-year technical assistance project, implemented by the United Nations Development Programme (UNDP) and co-financed by the Global Environment Facility (GEF), which is supporting the Government of South Africa in promoting the large - scale commercialization of wind energy. The South African Wind Energy Programme has been formulated in close collaboration with the Government's Department of Energy. The project has received US$2.3 million in GEF grant funding.

South Africa has for many years experienced overcapacity in energy, fueled by plentiful coal reserves; however, in recent years the country has faced rapidly rising energy demand. At the time of the Wind Energy Program's design, South Africa had 36 GW in national installed capacity, which was both struggling to reach peak demand and due for replacement within 20 years. In this context, the Government began exploring the promotion of renewable energies, including wind energy. While wind energy held good potential, key barriers to its establishment included the following: (a) a lack of a policy framework for renewable energies; (b) uncertainty from the ongoing restructuring of the power market; (c) very low coal- based energy prices; and (d) a lack of awareness and appropriate skills in local developers and investors.

Implementation. The first phase of the Wind Energy Program assistance included initial market and pre-feasibility studies to support Government officials on a range of issues related to wind energy. Studies included: Policy op-

tions on incremental cost mechanisms (e.g. green power market, tariffs and the Clean Development Mechanism (CDM)**;** Commercial requirements for grid connection (e.g., licensing and power purchase agreements)**;** Availability and accessibility of investment capital**;** Financial intermediation for independent power producers**;** and Pipeline development of future wind energy projects.

In a second phase, the Programme then supported the successful implementation, in 2008, of a first-of-its-kind independent power producer demonstration project, the 5.2 MW Darling wind farm. This demonstration project used a premium pricing model and entered into a 20-year power purchase agreement with the City of Cape Town, for which a UNDP-established, GEF-funded US$1.4 million Green Power Guarantee Fund was instrumental. In its current phase, assistance from the Programme is focused on national scale-up. The Programme has been a key contributor to South Africa's national REFIT (Renewable Energy Feed-In Tariffs) framework announced in 2009. It is now contributing to the forthcoming national integrated resource plan, which will establish the allocation and financing of REFIT and other incentives, over a necessary investment horizon of 2010-2030. In anticipation of this private sector investment, the Programme's activities include detailed wind mapping, capacity credit studies and local training in operations and maintenance.

Estimates of cost effectiveness. The Programme's leverage factor may be viewed by twomeasures: **(i)** Public flows (international and national): The Darling wind farm received US$10 million in co-financing from Denmark (DANCED and DANIDA), the Central Energy Fund and the Development Bank of Southern Africa. In addition, Cape Town's power purchase agreement with Darling will generate 4.8 million rand in annual income (inflation-adjusted) over 20 years; **(ii)** Private flows: Eskom, the State-owned utility coordinating independent power producer interactions, has currently received in excess of 3 GW in advanced- stage wind farm grid connection applications. The South African Wind Energy Association estimates that approximately 5 GW could be commissioned by 2015. In indicative dollar terms, every 1 GW of newly installed wind energy typically amounts to between US$1.5 billion and US$2 billion in capital investments.

Lessons for spending wisely. South Africa is now approaching a tipping point, where renewable energies will account for an increasingly significant portion of the nation's energy supply. The South Africa Wind Energy Program is an example of the importance of upstream technical assistance to put in place an optimum mix of policy and financial mechanisms which are tailored to each country's unique market status and macroeconomic conditions. The result is a risk-reward profile that attracts developers and investors at scale. Key to this scaling up is a shift from project-based to sector- wide approaches, such as the national REFIT. The next step in this shift is to identify new sources of financing, national or international, for example nationally appropriate mitigation actions or green bonds, which can provide transitional or long-term funding for such sector -wide incentives.

6 Conclusions and Recommendations

SAWEP is in many ways an excellent example of the relevant role of GEF-funded technical assistance to assist governments in overcoming barriers both policy, institutional and capacity-related and to create enabling environments for private sector investment in the renewable energy sector.

The project has reached its conclusion and all outputs have been concluded, with only the wind mapping output to be concluded in 2012. The budget has been utilised appropriately except the Green Power Guarantee portion, which remains in the DBSA. It is recommended that this fund shall be utilised in the coming year for the following three purposes:

- The conclusion of the Wind Atlas. Taken the importance and national significance of this output it is recommended that this output will continue to be supported through the allocation of a portion of the DBSA Green SAWEP Fund

- A study is being commissioned, with the remaining Green Fund budgets, for a half-year analysis of the present REFIT tender process, focusing on the impact this tender will have on the development of the private sector wind industry in South Africa. The study should focus on the key national issues for sector development, e.g. job creation, local content, black ownership, and how this is linked to and will be realised through the present tender process

- Finally, if no other source becomes available (e.g. REEEP), it is also recommended that the industrial strategy for wind power in South Africa be further developed and finalised through a phase 2.

It is furthermore proposed that a SAWEP Phase 2 should be initialised, if funds are available. A SAWEP phase 2 should focus on, amongst others, the following issues:

- Support ongoing Wind Atlas project

- Support Management and M & E of REBID Phase 1

- Support IRP2010 funding (“REBID Phase 2”) initiatives

- Strategic Framework for the optimal allocation of wind farms fine tuned e.g. integration of Wind Atlas WASA wind resource layer into national wind resource planning

- Capacity Credit study updated with WASA wind data

- Wind Power prediction investigation

- Support implementation of Revised RE White Paper policy and target for wind beyond 2013

- Wind turbine and components testing and certification capacity and infrastructure investigation and support

- Ongoing Awareness campaign, dialogue, education (Government, public, private sector etc)

- Support Wind Industrial Strategy development/implementation

- Support Wind Energy Education and Training initiatives (SAWEC etc).

7 Annexes

7.1 List of persons involved, some of which were interviewed

UNDP-GEF staff with project responsibilities

- Paul Brewah (UNDP Deputy Resident Representative (Operations), tel 012 354 8004, paul.brewah@undp.org)
- Israel Dessalegne (UNDP Deputy Resident Representative (Programmes), israel.dessalegne@undp.org)
- Eddy Russel (UNDP Operations and Programme, tel 012 354 8137, eddy.russell@undp.org)
- Khepi Shole (UNDP Assistant Resident Representative (Programmes), tel 012 354 8053, khepi.shole@undp.org)

UNDP Programme Manager for Environment and Energy

- Mpho Nenweli (012 354 8044, mpho.nenweli@undo.org)

UNDP RTA for Climate Change Mitigation

- Lucas Black (012 354 8132, lucas.black@undp.org.za)

Staff of the SAWEP Project Unit

- Andre Otto, SAWEP project manager (interviewed)

Executing agencies: DoE and municipalities

- Ompi Aphane (DoE DDG Electricity, Nuclear and Clean Energy, 0823361177, ompi.aphane@energy.gov.za)
- Mokgadi Mathekgana (DoE Chief Director Clean Energy, 082 449 7550, mokgadi.mathekgana@energy.gov.za)
- Noma Qase (DoE Director Renewable Energy, tel 012 4444105, noma.qase@energy.gov.za) (interviewed)

Members of the SAWEP Project Steering Committee

- Ronald Chauke representing Treasury and NERSA (NERSA Head of Department Electric Regulatory Reform, tel 012 401 4776, ronald.chauke@nersa.org.za)

- Mark Gordon (DEA Special Advisor, Energy and Climate Change, tel 012 310 3436/3103476, mgordon@environment.gov.za) (interviewed)

Project stakeholders and project beneficiaries

Eskom

- Kevin Leask (Chief Engineer, Strategic Grid Planning, tel 011 800 5994, leaskk@eskom.co.za0

- Riaan Smit (Chief Engineer Network Planning, Eskom Distribution: Western Region, tel 021 980 3452, riaan.smit@eskom.co.za), {both grid and capacity credit study]

CEF, SANERI

- Thembakazi Mali (Senior Manager: Clean Energy Solutions SANERI, tel 010 2014782, thembakazim@cef.org.za) [wind atlas] (interviewed)

- Raoul Goosen (interviewed)

SABS

- Standards Writer Specialist, tel 012 428 6613, breedws@sabs.co.za [standards]

DST

- Somila Xosa (Manager Biofuels, Research and Development, tel 012 843 6540, somila.xosa@dst.gov.za) [member of Wind Atlas PSC] (interviewed)

DTI

- Gerhard Fourie (Director Advanced Manufacturing, tel 012 3941151, gfourie@thedti.gov.za [Wind Industrial Strategy] (interviewed)

DEA

- Zaheer Fakir (Chief Director Chief Policy Advisor: International Governance and Relations, tel 012 310 3828/ 082-653 0630, zfakir@environment.gov.za)

- Gilbert Mosupye

- Noluthando Vithi

- Wynand Fourie (Senior Technical Advisor, tel 012 310 3703, wfourie@environment.gov.za) [member of SAWEP PSC]

DEADP (Dept Environmental Affairs and Development Planning Western Cape) [EIA, land use issues, SEA]

- Dipolelo Elford (Chief Director Environmental Sustainability, tel 021 483 2723, delford@pgwc.gov.za (interviewed)

- Helen Davies (Director Environmental Sustainability, Climate Change and Biodiversity, tel 021 483 5126)

- Nigel Gwynne-Evans (Director Manufacturing Industry Development, tel 021 483 3859, ngwynne@pgwc.gov.za)

DAFF [agricultural land use issues]

- Anneliza Collett (Directorate Land Use and Soil Management, tel 012 319 7508, annelizac@nda.agric.za)

SAWEA [industry association]

- Mark Tanton (interviewed)

- Johan van den Berg (SAWEA CEO, 082 925 5680, johan@sawea.org.za)

- Francis Jackson (Windlab, Engineering Development Manager, tel 021 701 1292, francis.jackson@windlab.com

- Duncan Ayling (Renewable Energy Systems Southern Africa Development Manager, tel 021 403 6385, duncan.ayling@res-sa.com)

- Noluthando Vithi (Director, International Governance, tel 012 310 3873, nvithi@environment.gov.za)

- Gilbert Mosupye (GMosupye@environment.gov.za tel 012 310 3677)

CSIR

- Pretoria: Hans Ittmann: Executive Director CSIR Built Environment, tel 012 841 2917/3051, hittmann@csir.co.za, (interviewed)

- Stellenbosch: Eric Prinsloo, tel 021 8882439, eprinslo@csir.co.za) [wind atlas, industrial strategy] (interviewed)

NERSA

- Thembani Bukula Regulator Member for Electricity, thembani.bukula@nersa.org.za

- Ronald Chauke

City of Cape Town

- Brian Jones (City of Cape Town Head Green Energy, tel 021 446 2015, brian.jones@capetown.gov.za) [Green Power Guarantee Fund] (interviewed)

GIZ

- Daniel Werner (Project Manager, tel 012 423 6361, Daniel.werner@giz.de) [grid, capacity credit studies] (interviewed)

Danish Embassy

- Jacques Pretorius (Trade section, 0834493601, jacpre@um.dk) (interviewed)

Darling wind farm

- Herman Oelsneer (interviewed).

7.2 List of documents reviewed

- Project Document and Project Appraisal Document
- Project implementation reports (PIR's)
- Annual Review Reports and Quarterly progress reports and work plans of the various implementation task teams
- Audits reports
- M & E Operational Guidelines, monitoring reports prepared by the project
- Financial and Administration guidelines
- The project M&E framework
- Knowledge products from service providers, including all technical reports commissioned by the projects
- Project operational guidelines, manuals and systems
- Minutes of the PMU Meetings, task teams and other project management meetings
- The GEF Implementation Completion Report guidelines
- The UNDP Monitoring and Evaluation Frameworks.