

**Danish Ministry of Climate,  
Energy, and Building**

**Department of Energy  
of RSA**

**Danish Support to Renewable Energy Development**

**in the**

**Republic of South Africa  
2013 - 2015**

**Draft 141212**

**Programme Document**

**Ref. No. 1806/1850-0002**

**December 2012**

## Cover page

Country:	Republic of South Africa	
Programme title:	<b>Danish Support to RE Development in the RSA, 2013-2015</b>	
National agency:	Department of Energy	
Starting date:	March 31, 2013	
Duration:	December 31, 2015	
Overall programme budget:	DKK 40 million	
<b>Background:</b>		
<p>The programme has been developed in response to the commitments made in the MOU of October 2011 between Denmark and RSA and to the Declaration of Intent on the South African Renewable Initiative (SARi) to which Denmark is a co-signatory. The programme has been designed with the view to assist RSA in implementing its policy on developing a low-carbon economy with special focus on electricity supply. This policy is formulated in the National Climate Change Response (NCCR) White Paper (2011), the Integrated Resource Plan for Electricity, 2010-30; White Paper on Renewable Energy (RE), 2003, the New Growth Path, Green Economy Accord, National Skills Development Accord and Local Procurement Accord. These plans are setting the legal framework, standards and targets for a gradual transition involving reduced reliance on coal based power generation through an increased use of renewable energy resources - namely wind, biomass, small hydro and solar.</p> <p><b>Programme objectives:</b> <i>Economic growth in the Republic of South Africa is decoupled from growth in overall GHG emissions through increased deployment of low carbon technologies.</i></p>		
<b>Programme components:</b>		
<p>The support will be delivered under the following components:</p> <p><b>Component 1: <u>Technical assistance to the Department of Energy.</u></b>  This will mainly include support to DoE in reviewing a White Paper on RE, developing an implementation strategy for the NCCR White Paper, in development of alternative scenarios for RE deployment, in carrying out socio-economic analyses of RE policies, and a smaller sub-component on energy efficiency.</p> <p><b>Component 2: <u>Further development of the wind atlas for RSA.</u></b>  Will contribute to the completion of a wind atlas covering most potential wind areas of South Africa that will facilitate future decisions on introducing wind energy in national electricity supply.</p> <p><b>Component 3: <u>Technical assistance to Eskom for RE integration in electricity supply.</u></b>  Will include the development of decision support tools with the objective of achieving maximised carbon mitigation effect of RE generation in South African through planning and technical integration.</p>		
For the Ministry of Climate, Energy and Building, Denmark Date: ..... ..... ( <i>name</i> )	For the Department of Energy, Republic of South Africa Date : ..... ..... ( <i>name</i> )	

## Map of South Africa



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## **List of abbreviations**

AC	Programme Advisory Committee
AfDB	African Development Bank
AMG	Aid Management Guidelines (Danida)
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung
CaBEERE	Capacity Building Project in Energy Efficiency and Renewable Energy
CCS	Carbon Capture and Storage
CDM	Clean Development Mechanisms
CIF	Climate Investment Fund
CSP	Concentrated solar Power
CSR	Corporate Social Responsibility
Danida	Danish International Development Assistance
DEA	Danish Energy Agency
DEA	Department of Environment Affairs (RSA)
DME	Department of Minerals and Energy (forerunner to DoE)
DTI	Department of Industry (RSA)
DoE	Department of Energy
DFI	Development Financing Institutions
EC	European Commission
EDK	Embassy of Denmark
EE	Energy Efficiency
Eskom	Electricity Supply Commission of South Africa
EU	European Union
GHG	Green House Gasses
IFC	International Finance Corporation
IPP	Independent Power Producer
IRP	Integrated Resource Plan
ISMO	Independent System and Market Operator
LCTU	Low Carbon Transition Unit (MCEB, Denmark)
LFA	Logical Framework Analysis
LTMS	Long-term Mitigation Scenario
MC	Programme Management Committee
MCEB	Ministry of Climate, Energy, and Building (Denmark)
MDG	Millennium Development Goals
MDTF	Multi Donor Trust Fund
MFA	(Danish) Ministry of Foreign Affairs
MOU	Memorandum of Understanding
MSME	Micro and Small and Medium Enterprises
MW	Mega Watt
NCCRWP	National Climate Change Response White Paper
NEES	National Energy Efficiency Strategy
NER	National Electricity Regulator
NGO	Non-governmental organisation

PIU	Project Implementing Unit
PV	Photo voltaic
PSC	Programme Steering Committee
PPA	Power purchase agreement
RE	Renewable Energy
REFIT	Renewable Energy Feed-in Tariff
RSA	Republic of South Africa
SAGEN	South African-German Energy Programme
SANEDI	South African National Energy Development Institute
SANERI	South African National Energy Research Institute (until 2011)
SAWEP	South African Wind Energy Program
SAWEA	South African Wind Energy Association
SCADA	Supervisory control and data acquisition
SDC	Swiss Development Corporation
SEFA	Sustainable Energy Fund for Africa
SME	Small and Medium Enterprises
TA	Technical Assistance
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Programme
WASA	Wind Atlas for South Africa

**Currency rates - as of June 2012 (interbank rates)**

1 DKK	= 1.41Rand	1 USD	= 5.71 DKK
1 DKK	= 0.13 EUR (€)	EUR (€)	= 7.45 DKK

## SUMMARY

### Introduction

South Africa was the 12th largest emitter of CO<sub>2</sub> in the world in 2009. South Africa has relatively high emissions for a developing country when measured both per capita and by emissions per unit of GDP. The power sector is the single largest emitter of CO<sub>2</sub> in South Africa accounting for 50 % of total carbon emissions. This is due to the country's almost total reliance on coal for electricity generation. The Government recognises that the high use of fossil fuels is contributing to climate change and regards climate change as one of the greatest threats to sustainable development. This is clearly stated in the *National Climate Change Response White Paper* published by the Government in October 2011 and in the *Integrated Resource Plan, 2010-30 (IRP2010)* which forms the basis for South Africa's power generation capacity expansion programme for the next 20 years. The IRP stipulates that electricity generation will go through a substantial transformation involving reduction in reliance on coal and a gradual shift to power generation based on renewable resources, namely wind and solar. 42% of new investments in generation capacity over the next 20 years are expected to be renewable energy technologies. The transformation of the electricity supply sector will require the development of new competencies in the regulation, management and operation of the South African power system. There is limited experience in Government and the state-owned utility, Eskom, in integrating renewable energy (RE) into the power sector. If renewables are to be recognised as a viable alternative to fossil-fuel based technologies and nuclear power and play an even greater role in GHG mitigation in South Africa it is important that the integration of RE occurs efficiently and in a manner that realises the full potential of RE in the power system. This requires that regulatory and technical experiences gained in countries with high penetration levels of RE, such as Denmark, be transferred to South African counterparts in Government and in system operations and transmission planning in utilities.

### Background and rationale

Denmark has a strategic priority to strengthen cooperation with South Africa in the area of renewable energy and energy efficiency as expressed in the Memorandum of Understanding between the two Governments signed 24 October 2011. The Ministry of Climate, Energy and Building has initiated a dialogue with the Government of South Africa on the framework for Danish financing and technical assistance to a low carbon transition within the energy sector, specifically targeting renewable energy initiatives.

The funding for the assistance to RSA will be sourced from the Global Framework under the Danish 2012 - Climate Envelope, which is part of Denmark's contribution of DKK 1.2 billion to 'fast-start' financing following the commitment made in the Copenhagen Accord at COP 15. On this basis Denmark is initially offering to support energy sector initiatives in South Africa with DKK 40 million over a period of three years.



The programme document is based on the findings of a Fact-finding and Formulation Mission to South Africa from 3 - 8 June, 2012. Meetings were held with key stakeholders in the electricity sector and with other development partners already active in the energy sector. This included among others some of the donors who are signatories to the Declaration of Intent on the South African Renewables Initiative (SARi).

The Programme has been designed in an attempt to assist South Africa in meeting its stated goals for a future low-carbon economy. In this process the country may go through a development similar to those experienced in Denmark over the last 20-30 years. Sector institutions in South Africa are fully aware of Danish experiences from this similar transition, and have a strong belief that they can benefit from a closer cooperation between related institutions in shaping and implementing their RE strategies.

### **Programme objective and overview of components**

The development objective is: *Economic growth in the Republic of South Africa is decoupled from growth in overall GHG emissions*

The intermediate objective is: *Increased deployment of low carbon technologies in the energy sector*

The achievement of these objectives will be supported through three programme components as follows:

#### **Component 1: Technical assistance to the Department of Energy**

The immediate objective of the component is: *facilitate the development of a less carbon intensive electricity sector by assisting the DoE develop more comprehensive energy planning capabilities that encompass the efficient deployment and integration of renewable energy and energy efficiency technologies.*

Programme activities will be focused on achieving the following outputs:

- Capacity built in DoE to address critical issues related to integration of RE in national electricity supply
- A revised White Paper on RE is produced
- NCCR White Paper implementation strategy for the power sector is completed by DoE
- Support for a financial expert who can assist in developing and establishment of the financial model of SARi
- Support for renewable energy training centre – SARETC
- Capacity building activity supporting policy development and regulation in the field of Energy Efficiency
  - Policy development on energy efficiency in existing buildings

- Development of regulatory framework for smart meters
- Implementation of smart meter technology in public buildings
- Analysis of energy demand initiatives in public buildings based on smart metering
- Capacity building of DoE staff on policy development for energy efficiency through twinning with Danish expertise
- National Energy Efficiency Awareness Campaign Strategy.

### **Component 2: Further development of the Wind Atlas for South Africa, WASA 2**

The immediate objective of the component is: *The national potential of wind power for displacing power generation using fossil fuels is documented and used for the development and implementation of future investments in wind based electricity generation*

The activities under the component will produce the following outputs:

- A wind atlas including 5 new measuring masts covering remaining areas of Eastern Cape, KwaZulu-Natal and parts of Free State Provinces
- Continued metering from existing measuring masts established under WASA1 of SAWEP Phase 1
- Mapping of potential as input to DoE for strategic energy planning purpose
- Collaboration with Eskom on data for day-ahead and in-hour forecasts

### **Component 3: Technical assistance to Eskom for RE integration**

The immediate objective of the component is: *maximise carbon mitigation through the efficient planning and technical integration of renewable energy technologies into the South African power system.*

The planned activities will enhance Eskom's internal capacity to address the challenges involved with integration of RE in power supply, and Eskom will have developed internal Decision Support Tools for planning and operations within key areas such as:

- Integration and simulation of renewable energy technologies in the Integrated Resource Plan
- Integration and simulation of transmission in Integrated Resource Plan
- Methodology for identifying strategic investments in transmission planning
- Development of system planning in Eskom
- Standards and guidelines for system operation with variable generation
- Identification of flexibility and reserves for integrating variable generation
- Development of fast track procedures for small projects in Grid Access Unit

### **Programme organisation and management**

The programme will be managed jointly by DoE and MCEB, who each will appoint a representative in a Management Committee with responsibility for coordination through a TA facility, that will receive applications from the partners within the scope of component 1 (DoE) and component 3 (ESKOM). Component 2 on Wind Atlas for

South Africa, phase 2, will be managed and implemented as the former WASA phase 1. SANEDI will be the holder of the project and implement in partnership with DTU/Risø and other service providers.

SANEDI will provide assistance in the daily operation of the facility, providing basis for the Management Committee to take decisions. This will include initial screening of ToR, setting up tendering and procurement of TA services, financial management of TA assignments, monitoring of outcomes and report back to the Program Coordinator. The SANEDI service contract will be on a fixed administrative fee (maximum 5% of the TA portfolio from components 1 and 3). SANEDI will submit financial reports, audits and results to the program coordinator, who will feed relevant information into the Danish management system.

An Advisory Committee with representation from all partners (DoE, SANEDI, ESKOM and MCEB) will provide strategic guidance for the program on approaches and focus of the TA Facility to support the overall objective of the program. The Advisory Board will help identify barriers to be addressed by the program, improve coordination of TA assignments (also from other donors) within and between the partner institutions, e.g. having in mind capacity constraints and planning processes. This will ensure that the South African, regional and Danish resource bases are identified for the program. The Program Coordinator will function as secretary to the Advisory Committee. The Advisory Committee will meet at least bi-annually but may be called by the Management Committee on demand.

### Budget estimate for 2013 – 2015

	DKK
<b>TA Facility:</b>	
Component 1 (DoE) (indicative allocation) <sup>12</sup>	18.750.000
Component 3 (Eskom) (indicative allocation) <sup>1</sup>	6.750.000
Administrative support (SANEDI)	1.125.000
<b>WASA II:</b>	
Component 2 (SANEDI)	12.000.000
<b>Program Coordinator (3 years)</b>	1.375.000
<b>Total</b>	<b>40.000.000</b>

Se Annex 4 for details

### Cross-cutting issues

Cross cutting issues programme include poverty, gender equality, environment, and governance. Each of these issues is dealt with in the main document.

### Financial management and procurement

The final modalities for disbursement, management and procurement of the climate funds are not fixed to a single set of rules leaving several options open. These options include:

<sup>1</sup> Any need for reallocation may be considered by the inception review

<sup>2</sup> 3 million DKK is allocated to an Energy Consultant to be tendered in Denmark - Exact amount to be determined

- National or international procurement of short/long term TA using South African procurements rules
- Procurement in Denmark of Danish short/long term TA, following EU-regulations
- Setting up twinning arrangements between Danish and South African institutions or authorities, using the EU Guidelines for twinning arrangements.

### **Monitoring, reviews & evaluation**

A monitoring system will be set up with a view to secure full transparency in programme management. The monitoring will be based on periodic reporting.

*(Quarterly) progress reports* will be prepared by each component and submitted to DoE as inputs to the meetings of the Advisory Board. *Annual reports* will be produced by DoE on the basis of input from each component.

The *first annual report* shall serve as input to the Joint Mid-term Review which is expected to take place in the beginning of 2014. The objective will be to take stock of what has been achieved during the first year and to make recommendations on changes to work plans and budgets, including possible reallocation of funds, for the remaining period.

The *third annual report* shall be prepared in a format which will meet the requirement for a Programme Completion Report.

In preparing these reports programme management shall be guided by the Danida Aid Management Guidelines for Programme Support.

Evaluations, if any, will take place at the discretion of the Evaluation Department of Danida.

### **Assumptions and risks**

A key assumption for the Programme is that RSA maintain its political will to implement its stated strategy for a low carbon transition. Furthermore it is assumed that the Government of RSA takes full ownership to the IRP2010 as a joint strategy for sector development. Finally it is assumed that economic development in RSA continues at its present level (this cannot be guaranteed because economic development is also influenced by developments in other countries).

The RSA Government appears to have a strong commitment to deliver in accordance with its present climate mitigation commitments. The greatest risk is if the present economic situation has unexpected negative effects causing difficulties in securing sufficient resources required for the planned sector investments. This risk, however, appears to be low.

The transfer of SARi from the DTI to the DoE, should be seen as a confirmation of the intention of Government to have DoE play a key role in relation to RE and the

ability of DoE to perform this function. It is assumed that DoE has commitment and capacity to take responsibility for overall programme coordination in general and for implementing the activities under its own component.

For the mapping of wind resources it appears that it may not be possible to find the additional external funding to also cover the part of Northern Cape that was not covered in WASA1. This has been mitigated by reducing the scope to match the funds available from Denmark by limiting the geographical outreach in RSA to those areas with more promising wind resources. Experience has shown that theft of equipment also poses a risk for the integrity of the data collected. Mitigation options are currently being developed to deal with this issue at the existing mast sites.

There do not appear to be major risks associated with Eskom hosting the third component. Eskom Transmission's engagement in cooperation projects involving interactions with Danish power utilities and consultants has already played a role in a more positive attitude towards renewables. The programme will focus on capacity building with Eskom System Operations and Energy Planning and Eskom Transmission division.

The fiduciary risk appears to be low as RSA has a good track record in managing ODA.

## 1 Introduction

South Africa is the 12<sup>th</sup> largest emitter of CO<sub>2</sub> in the world responsible for 450 Mt of CO<sub>2</sub> emissions in 2009, nearly half of Africa's total carbon emissions. South Africa has relatively high emissions for a developing country when measured per capita and by emissions per unit of GDP as shown in Table 1 below.

**Table 1: Comparison of key indicators for GHG emissions in 2009 for the 4 developing countries in the BRICS group and OECD countries (EIA, 2012 & IEA, 2011)**

2	t CO <sub>2</sub> emissions/capita	kg CO <sub>2</sub> emissions/US\$ GDP
South Africa	9.36	2.03
China	5.44	2.33
India	1.40	1.81
Brazil	2.09	0.39
OECD	10.37	0.41

The power sector is the largest emitter of CO<sub>2</sub> in South Africa accounting for 50 % of total carbon emissions. This is due to the country's almost total reliance on coal for electricity generation with 94 % of electricity produced in 2009 coming from coal-fired power plants. The electricity sector's reliance on low-cost coal-based electricity generation is one of the main contributors to the high carbon intensity of the South African economy (National Treasury, 2010).

The South African government regards climate change as one of the greatest threats to sustainable development and believes that climate change, if unmitigated, has the potential to undo or undermine many of the positive advances made in meeting South Africa's own development goals and the Millennium Development Goals (DEA, RSA, 2011).

One of the major climate change mitigation issues facing South Africa is a reduction of GHG emissions from the power sector, primarily by reducing reliance on coal. The South African government developed Long Term Mitigation Scenarios (LTMS) for GHG emissions. These predicted that emissions would quadruple by 2050 if no measures were taken to ensure changes in the country's fuel mix. Most of these emissions would stem from growth in the electricity supply industry and transport sector.

During the 2009 Copenhagen climate negotiations, South Africa announced that it would act to reduce domestic GHG emissions by 34 % by 2020 and 42 % by 2025 compared to the business as usual scenario in LTMS. This initiative was subject to the availability of adequate financial and technological support.

The National Climate Change Response White Paper (NCCRWP) realised that if South Africa is to achieve these targets large mitigation contributions will have to come from reduced emissions from energy generation and use. Energy efficiency, demand side management and increasing investments in a renewable energy program were identified as the most promising mitigation options in the electricity sector (DEA, 2011).

The NCCRWP recommends that policy decisions on new infrastructure investments in the electricity supply sector must consider climate change impacts in order to avoid the lock-in of emission intensive technologies in the future. This was reflected in the publishing of the policy adjusted Integrated Resource Plan for Electricity (IRP) in 2011, which restricted total carbon emissions from the power sector to 275 Mt annually from 2025. The IRP forms the basis for South Africa's power generation investment programme for the next 20 years and is revised every second year.

The current IRP stipulates that electricity supply sector will go through a substantial transformation involving reduction in reliance on fossil fuels – in particular coal – and a gradual shift to power generation based on renewable resources namely wind and solar. This will result in renewable energy playing an important role in the future power mix in South Africa. 42% of all new electricity generating capacity to be built in South Africa up to 2030 is earmarked for renewable energy technologies in the current IRP.

The first step in realising these policy targets has been the launch of the Renewable Energy Independent Power Producer Procurement Programme (REIPPP) by DoE. This aims at procuring 3,752 MW of RE capacity to be commissioned by the end of

2016. The first two bidding rounds have secured 2,459 MW of RE capacity. The remaining three rounds will be held in 2012 and 2013.

The transformation of the electricity supply sector will require the development of new competencies in the regulation, management and operation of the South African power system. There is limited experience in Government and the state-owned utility, Eskom, in integrating renewable energy into the power sector. If renewables are to be recognised as a viable alternative to fossil-fuel based technologies and nuclear power and play an even greater role in GHG mitigation in South Africa it is important that the integration of RE occurs efficiently and in a manner that realises the full potential of RE in the power system. This requires that regulatory and technical experiences gained in countries with high penetration levels of RE, such as Denmark, be transferred to South African counterparts in Government and in system operations and transmission planning in utilities.

The present programme takes its point of departure in the above policy and planning documents and dialogue with key actors in South Africa, and should be seen as a logic continuation of previous Danish support to environment and renewable energy initiatives in South Africa.

### **3 Background**

Denmark has a strategic priority to strengthen cooperation with RSA in the area of renewable energy and energy efficiency as expressed in the Memorandum of Understanding between the two Governments signed 24 October 2011. The Ministry of Climate, Energy and Building (MCEB) and the Danish Ministry of Foreign Affairs have initiated a long term dialogue with the Government of RSA on the framework for the Danish financing and technical assistance of a low carbon transition within the energy sector in RSA, specifically targeting renewable energy initiatives.

The funding for the assistance to RSA will be sourced from the Global Framework under the Danish 2012 - Climate Envelope, which is part of Denmark's contribution of DKK 1.2 billion in total in 2010-2012 to 'fast-start' financing following the commitment made in the Copenhagen Accord at COP 15. On this background Denmark initially is ready to support energy sector initiatives in RSA with an amount of DKK 40 million over a period of three years. Focus will be on the introduction of RE in overall energy supply as well as a smaller component on EE.

One part of the Global Framework under the Climate Envelope 2012 focuses primarily on mitigation (another part has an adaptation focus) related activities in middle income and growth economies where rapid development is leading to a significant rise in GHG emissions. These countries typically have institutional and technical capacity that enables them to benefit directly from Danish experiences in developing the necessary policy structure and technical competencies for a low carbon transition. A Low Carbon Transition Unit (LCTU) has been established at the Danish Ministry of Climate, Energy, and Building (MCEB) to administer the GHG mitigation

activities under the Climate Envelope 2012. This includes energy sector initiatives in South Africa and other fast-growing developing countries.

The elaboration of the present programme document is based on the findings of a Fact-finding and Formulation Mission that were in South Africa from 3 - 8 June 2012. Meetings were held with key stakeholders in the energy sector and with other development partners already active in the energy sector. This included among others donors that are co-signatories to the Declaration of Intent on the South African Renewables Initiative (SARi) from July 2011.

During the fact-finding and formulation mission the Formulation Team held extensive meetings and discussions with key players in the power sector namely the DoE, Eskom and SANEDI. In preparation of these talks and/or during the visit each of these agencies had prepared proposals for priority RE related activities suggested to be included in the programme to be funded by Denmark. After the mission a smaller component on EE has been identified in dialogue with DoE.

### **3.1 Previous and on-going Danish development support**

With South Africa moving from a recipient of development assistance to becoming emerging economy traditional development assistance from Denmark has gradually been phased out since 2007 and is expected by and large to be fully phased out by end of 2014. Future relationships between Denmark and RSA will be concentrated on increased commercial relations as well as on increased political dialogue.

Since the early 1990s Denmark, through various programmes, has supported South Africa with environment and energy projects. Denmark has played an important role in assisting South Africa in developing the regulatory framework for the introduction of renewable energy. However, in line with the general development in the relations between South Africa and Denmark this cooperation has in recent years, focused more on a general cooperation and less on a traditional donor/recipient relationship.

Thus in 2009 a Declaration of Intent were signed regarding cooperation on environmental and energy issues. In October 2011 this declaration of Intent was upgraded through the signing of a MoU between Denmark and South Africa.

Of the more recent development projects in the energy sector, the following should be highlighted:

- The Danish Government contributed DKK 27 million to the Capacity Building Project in Energy Efficiency and Renewable Energy (CaBEERE) project from 2001 to 2005. CaBEERE was a joint project between the South African Government and Denmark that aimed at building capacity in energy efficiency and renewable energy policy development in South Africa with the objective of increasing the use of RE and energy efficiency throughout South Africa to maximise the energy sector's contribution to sustainable



development. A series of activities were implemented under CaBEERE including the formulation of the White Paper and subsequent national strategy for Renewable Energy as well as the formulation of the national strategy for energy efficiency.

- Denmark provided ZAR 600.000 to assist in the issuing and analysis of the Request for Information on Market Interest for Investments in Renewable Energy in 2010. This resulted in a report mapping the interest and market potential for RE in South Africa. This played an important role in justifying the inclusion of higher levels of RE in the policy adjusted IRP. Denmark extended this assistance to developing the REIPPP Programme through assisting Government in interactions with Eskom on the role of the system operator and grid companies under the REIPPP and the development of a non-discriminatory grid code for wind turbines in South Africa in 2011.
- With co-funding (DKK 10 million) from Denmark the DTU/National Laboratory for Sustainable Energy (RISO) in collaboration with the South African National Energy Research Institute (SANERI), the South African Weather Services, the University of Cape Town and the Centre for Scientific and Industrial Research (CSIR) developed a wind atlas that maps wind energy resources in the coastal provinces of South Africa.
- Denmark assisted South Africa in realising its first wind farm by contributing a grant of DKK 15.1 million for investment and technical assistance to the Darling wind farm, which is a national demonstration project.
- An Urban Environmental Programme from 2005 to 2010 with a budget of DKK 220 million, which focused on improving the environment and energy sector in the urban areas in South Africa.

Technology and skills transfer have been the core of Denmark's efforts to develop a more sustainable energy sector in South Africa and Denmark is committed to assisting South Africa in establishing the necessary structures and frameworks for integration of renewable energy as a key element in climate change mitigation and reduction of GHG emissions.

The present programme is to be seen as a logic continuation of previous and on-going support to climate change mitigation and has been formulated in response to the stipulations and principles laid down in the Declaration of Intent on the South African Renewable Initiative (SARi).

The proposed programme is in line with the recommendations of the Danish Africa Commission Report published in 2009 and will have potential synergies with the Danida funded Sustainable Energy Fund For Africa (SEFA) and the African Guarantee Fund (AGF) both developed in response to the recommendations in this report and both managed by the African Development Bank. SEFA provides equity funding for SMEs for projects related to RE development. The support through

SEFA can be combined with guarantees from the AGF who provides guarantees to financial institutions in all African countries.

### **3.2 Donor activities in the RE sector in South Africa**

All of the signatories to the SARi declaration have or will have their own bilateral programmes supporting energy efficiency and climate change mitigation activities in South Africa. Based on meetings and discussions with various development partners the present extent of donor support to the energy sector may be briefly outlined as follows:

**Germany** - working through BMZ, GIZ and KfW - is strongly involved in the energy sector and has committed EUR 14.5 million for technical assistance (GIZ) and EUR 72 million for financial support (KfW) for RE/EE activities for the period 2010 – 2013. Most German assistance has been through the South African-German Energy Programme (SAGEN). The assistance is focused on three core areas being promotion of renewable energy and energy efficiency, a climate support programme, and a programme for skills development for ‘green jobs’ creation. KfW has loan funds available for RE investments, but can only deal with agencies with authority to sign loan agreements. The National Treasury of South Africa is a key partner. German technical assistance is quite comprehensive and could potentially overlap with some of the activities proposed for support from Denmark. The DoE has a role in ensuring that such overlapping is avoided as far as possible.

The **UK** through DFID is supporting an Industrial Energy Efficiency Programme, a Strategic Climate Change Policy Fund for South Africa, and a programme for Scaling up Renewables Deployment. A budget of GBP 15-20 million is presently available for RE interventions. This funding is mainly for TA. Some funds are channelled through UNIDO and SDR. The British High Commission recently approved ZAR 1.5 million to assist the NCCR White Paper to start with some initial work which will be in line with the Mitigation Potential Analysis to inform further specific studies and on sector/subsector strategies. Thus alignment with the Danish program is needed. In addition GBP 95 million of grant funds are available for sector related investment. The funds are provided by Department of Energy and Climate Change (DECC) of the UK. All is grant money and managed as proper ODA. Ways are sought to use this grant funding to leverage additional loan funds from DFIs. Funds will mainly be used for investments in support of the IRP.

The **EC** is focusing on clean coal technology, energy efficiency, energy planning, and financial models. The Infrastructure Investment Programme for Africa includes a special window for RE development. Most aid from the EC is provided as general budget support (EUR 250 million for a 5 year cycle).

**Norway** is looking for a ‘niche’ in carbon mitigation with focus on CCS -carbon capture and storage and the introduction of ‘green taxes’. National Treasury is an important partner, whereas Norway has less collaboration with DoE. The Norwegian Ministry of Environment is planning activities in RSA on carbon reduction issues

including carbon trade. Norwegian companies are interested in contracts on PV investments.

**Finland** has no bilateral development cooperation with RSA, but parts of the regional SADC programme including its RE strategy is supported. Some seed funds are available for commercial RE projects in RSA (EUR 2.5 million). The main focus is on the private sector and on natural resources.

**Switzerland** (SDC) does not have its own projects on RE. Focus is on energy efficiency (together with DFID) in industrial processes and the implementation of appliance labelling. Most activities are implemented in cooperation with the Department of Industry. The present budget is CHF 6 million.

**USAID** does not have any specific bilateral programmes in RSA within the energy sector. All assistance on RE and EE is provided with a regional approach.

## **4 Economic and energy sector contexts**

### **4.1 Economic growth and energy consumption in the Republic of South Africa**

South Africa's energy consumption per capita and CO<sub>2</sub> emissions per capita have been growing faster than real GDP per capita and the current emission profile poses a significant challenge to the country's energy development strategy, as South Africa's vast dependence on fossil fuels does not go without a price in terms of atmospheric pollution including a high level of GHG emissions.

### **4.2 Framework for RE development and investments**

The development of the energy sector in RSA is guided by a series of policy documents and legal instruments as follows:

#### **The White Paper on Energy Policy of 1998**

The national energy policy of South Africa is contained in the White Paper on Energy Policy that was published in 1998. The White Paper on Energy Policy is an overarching document which sets out the government's official policy on the supply and consumption of energy. The policy has five objectives for the energy sector being: increasing the access to affordable energy services; improving energy governance; stimulating economic development, managing energy related environmental impacts, and securing diversity in energy supply. This last objective addresses the need to provide alternative sources of energy including renewables. It recognises the potential of renewable energy in securing supply through diversity.

#### **The White Paper on Renewable Energy (2003)**

This policy is dedicated to the deployment of renewable energy and sets a target of 10000 GWh of energy to be produced from renewable sources of energy by 2013.

The promotion of renewable energy is considered in six focal areas, namely: financial instruments; legal instruments; technology development; awareness raising; capacity building and education; market based instruments and regulatory instruments.

The Policy has a number of objectives including ensuring that equitable resources are invested in renewable technologies; directing public resources for implementation of renewable energy technologies; introducing suitable fiscal incentives for renewable energy and; creating an investment climate for the development of a renewable energy sector. Other issues raised include potential large scale roll out of solar water heaters and enlistment of Independent Power Producers to contribute to the diversification of the energy mix.

### **The National Integrated Resource Plan for Electricity, 2003**

The National Electricity Regulator and Eskom developed a National Integrated Resource Plan (NIRP) in 2003 that mapped the commissioning of new generating capacity until 2022. Even though the environmental effects of each alternative were summarised in the NIRP the preferred investment scenario had the highest CO<sub>2</sub> emissions, the joint-highest SO<sub>x</sub> and NO<sub>x</sub> emissions and the highest water usage. The NIRP concluded that coal will remain the fuel of choice over the twenty-year planning period with 86.75% of the generating capacity being coal-fired. The remainder was nuclear, diesel and pumped storage.

The NIRP included a cost estimate for the inclusion of RE in the power system, but by its own admission this was not done on a least-cost basis and the result was that RE was excluded from the recommended investment programme.

The intention was to release a revised NIRP in 2006 and at regular intervals after that. This was never done. The IRP 2010 published by the DoE superseded NIRP.

### **The Energy Act of 2008**

The Energy Act became effective in 2008. The purpose of the act is to ensure that diverse energy resources are available, in sustainable quantities and at affordable prices and to provide for integrated energy planning, increased generation, and consumption of renewable energies.

### **The Integrated Resource Plan for Electricity, 2010 - 2030**

The IRP is a plan that directs the expansion of the electricity supply over the given period. The IRP is updated every second year. The first draft of the next IRP is expected at the end of 2012.

The existing IRP2010 went through a planning process, which included a first round of public participation in 2010. This led to a Revised Balanced Scenario (RBS) published in October 2010. After a second round of public participation several

adjustments were made to the RBS. These changes were the result of integrating new scenarios taking into consideration updated information unit costs of alternative nuclear and RE technologies as well as emission constraints on carbon dioxide. The adjusted data for RE technologies was largely based on the results and analysis of the Request for Information issued to potential developers of renewable energy projects under the REFIT programme in South Africa. The analysis was funded by the Danish Embassy in Pretoria in 2010.

These adjustments lead to the Policy-Adjusted IRP2010 which was adopted by Cabinet in 2011. The IRP2010 is designed to meet the commitment made by South Africa to mitigate climate change. It assumed that it would be possible to cap carbon dioxide emission at 275 million tons per year after 2024. The final plan suggests that 42 % of all new generation capacity by 2030 shall be based on RE technology, 6% of import hydro, 6.2% will be Nuclear (after 2024) and only 6.3% of additional capacity will be from coal. In relation to total generation capacity 9% will come from renewable energy sources by 2030 as compared to 0% in 2010.

### **South Africa's New Growth Path**

The New Growth Path has set job creation as a country priority, aimed at reducing unemployment by 10 percentage points by 2020, down from the current rate of 25 per cent and has fixed six priority areas to job creation: infrastructure development, agriculture, mining, manufacturing, the "green" economy and tourism.

Achieving the New Growth Path requires that key tradeoffs are addressed. Amongst other decisions, government must prioritise its own efforts and resources more rigorously to support employment creation and equity; business must take on the challenge of investing in new areas; and business and labour together must work with government to address inefficiencies and constraints across the economy and partner to create new decent work opportunities. Some key trade-offs include:

- Between present consumption and future growth, since that requires higher investment and saving in the present;
- Between the needs of different industries for infrastructure, skills and other interventions;
- Between policies that promise high benefits but also entail substantial risks, and policies that are less transformative and dynamic but are also less likely to have unintended consequences;
- Between a competitive currency that supports growth in production, employment and exports and a stronger rand that makes imports of capital and consumer goods cheaper; and
- Between the present costs and future benefits of a green economy.

### **The National Climate Change Response White Paper of 2011**

This White Paper which was published in October 2011 prior to COP17 presents the South African Government's vision for an effective climate change response and the long-term, just transition to a climate-resilient and lower-carbon economy and society.

The White Paper also represents RSA's contribution to the global effort to stabilise GHG concentrations in the atmosphere at a level that avoids interference with the climate system within a timeframe that enables economic, social and environmental development to proceed in a sustainable manner.

In terms of strategic priorities, the White Paper sets out South Africa's climate change response strategy to achieve the National Climate Change Response objective in a manner consistent with the outlined principles and approach and which is structured around a number of strategic priorities.

In terms of adaptation, the National Climate Change Response includes a risk-based process to identify and prioritise short- and medium-term adaptation interventions to be addressed in sector plans. The process will also identify the adaptation responses that require coordination between sectors and departments and it will be reviewed every five years.

## **5 Proposed interventions for the programme**

Prior to and during the Formulation Mission national sector authorities had been requested to present proposals for possible funding from Denmark. In response the following proposals were submitted for consideration.

### **5.1 Department of Energy**

The DoE submitted a list of proposals under the following headings not outlined in the order of preference:

1. Support to a Revision of the Renewable Energy White Paper
2. Support to a wind energy awareness campaign.
3. Development of awareness materials for all clean energy technologies.
4. Developing of a proper data capturing analysis and reporting system for RE annual reporting.
5. Support to the establishing of a South African Renewable Energy Training Centre
6. Support to the South African Renewable Energy Initiative (SARi)
7. Implementation of the Energy Efficiency Campaign Strategy.
8. Implementation of the South African Wind Energy Programme, Phase 2
9. Development of an Energy and Climate Change Strategy for power sector compliance with NCCRWP.

### **5.2 Wind Atlas, Phase 2**

This proposal was briefly presented in the DoE request (point no. 8 and partly point 4 in section 4.1 above) and further elaborated in a presentation and documentation

received from SANEDI. The proposal outlines phase two of the WASA project with two new activities:

1. Local expansion of WASA to cover remaining areas of Northern Cape, Eastern Cape, KwaZulu-Natal and parts of Free State Provinces (80% + of South Africa).
2. A package of Technical Assistance to Regional Expansion of wind mapping covering neighbouring countries, namely Lesotho, Namibia, and Mozambique. It is assumed that the cost of infrastructure (masts and equipment) would be covered by the Government of Namibia.

### **5.3 Eskom**

In the meetings with Eskom Transmission and Eskom System Operations and Planning the following activities were proposed for consideration:

Energy Planning related issues:

1. Simulation of wind generators in power system modelling to ensure sensible optimization and energy adequacy in the long term energy planning model
2. Modelling of the conversion of wind into electrical power for various designs and sizes of wind generators (also to convert wind measurements at a site to realistic power delivery to be expected from a wind farm at and around the site)
3. Development of locational signals in the long term energy model for use as early siting signals for wind generators

Transmission Grid Planning related issues:

1. Strategic planning philosophy and approach to ensure least cost generation and transmission system development
2. Scenario planning for optimal system operation of the grid (identification of infrastructure which would result in the reduction of operational costs)
3. Suitable standard models for wind and solar PV integration studies, both steady state and dynamic
4. Determination of quality of supply impacts of renewable energy integration

System Operations related issues:

1. Protection Grading with RE connected to Distribution networks
2. Regional/Area control operational philosophies with regards to increased renewable penetration in Dx networks
3. Voltage control particularly on lower voltage networks
4. Weather forecasting and prediction methodologies, tools and how to ensure reliability of weather information (considering wind and PV)
5. Incorporating RE availability into forecasting models

6. How to effectively monitor, aggregate and dispatch RE plants from the Grid operators perspective, what tools are currently being used and to what effect,
7. RE certification and commissioning practices, procedures and policies
8. Strategy for a System Operator or ISMO to move from single buyer to open market and still ensure economics and affordability. Skills and competency requirements for full operations and maintenance of a RE integrated power system and the possibility to put skills transfer programmes in place
9. Lessons learned from Danish perspective
10. Managing information interchange from SCADA and forecasting/dispatch perspective

### **Programme identification**

Following discussions of each proposal between the team and the proponents as well as the related beneficiaries all proposals have been evaluated in relation to various criteria for eligibility and taking into account the following considerations for activities under the Global Framework under the Climate Envelope 2012 and the Low Carbon Transition Units (LCTU) goals in RSA, namely that:

- The activities potentially contribute to significant emission reductions in global GHG emissions
- The activities support the transformation of the electricity supply industry and reduce reliance on fossil fuel based generation
- Supported activities in RSA focus on renewable energy initiatives where there is a link to Danish competencies and experience
- The activities provide technical and/or financial support to South Africa in achieving the targets announced at climate change negotiations in Copenhagen in 2009
- The activities can be used to leverage other countries of importance to the total mitigation effort in the region or globally
- The activity is leading to new or supporting existing partnerships between Denmark and relevant actors in RSA
- Supplement or support the South African Renewable Initiative (SARi)

Additional criteria have included whether the proposals are addressing needs not already supported from other development partners or national RSA resources.

Based on this analysis it has been decided and agreed that the Danish support shall consist of three separate components in which proposed and accepted activities have been bundled as follows:



**Component 1: Technical assistance to the Department of Energy.**

This will mainly include support to DoE in reviewing a White Paper on RE, developing an implementation strategy for the NCCR White Paper, in development of alternative scenarios for RE deployment, in carrying out socio-economic analyses of RE policies, and a smaller sub-component on energy efficiency.

**Component 2: Further development of the wind atlas for RSA.**

Component 2 will contribute to the completion of a wind atlas covering most potential wind areas of South Africa that will facilitate future decisions on introducing wind energy in national electricity supply.

**Component 3: Technical assistance to Eskom for RE integration in electricity supply.**

Component 3 will include the development of decision support tools with the objective of achieving maximised carbon mitigation effect of RE generation in South African through planning and technical integration.

## **6 The programme**

### **6.1 Overall programme rationale**

The Programme has been designed to assist South Africa in meeting its stated goals for a future low-carbon economy. Transformation of the power sector is a key element in achieving climate mitigation targets in South Africa. The transformation process of the power sector in South Africa is, to some extent, reminiscent of that which Denmark experienced from the 1980's and to the present day with a move away from heavy reliance on coal to increasing penetration of RE in the power mix.

Sector institutions in South Africa are fully aware of Danish experience from its transition, and have a strong belief that they can benefit from a closer cooperation between related institutions in shaping and implementing the new RE strategies of RSA. This is especially recognised in policy development, power system planning and system operation.

The South African utility, Eskom, is also currently in the process of being restructured with System Operation and Energy Planning and Eskom Transmission being separated from Eskom Generation and reconstituted as a transmission system operator independent of the commercial generation activities in Eskom. It is important that the new, independent system operator has sufficient capacity and know-how to integrate RE efficiently otherwise the viability of RE for carbon mitigation may be questioned and alternative, non-renewable measures favoured such as increased nuclear generating capacity and carbon capture and storage at the expense of RE.

The Programme shall be seen as a response to the MoU signed between Denmark and RSA in 2011 and a natural follow-up on the commitments Denmark made by signing up on the Declaration of intent on SARi in 2011.

## 6.2 Development and intermediate objectives of the programme

The development objective of the programme is “***economic growth in the Republic of South Africa is decoupled from growth in overall greenhouse gas emissions***”.

The South African government regards climate change as one of the greatest threats to sustainable development and believes that climate change, if unmitigated, has the potential to undo or undermine many of the positive advances made in meeting South Africa’s own development goals and the Millennium Development Goals (DEA, RSA, 2011). The NCCR White Paper states "South Africa will build the climate resilience of the country, its economy and its people and manage the transition to a climate-resilient, equitable and internationally competitive lower-carbon economy and society in a manner that simultaneously addresses South Africa's over-riding national priorities for sustainable development, job creation, improved public and environmental health, poverty eradication, and social equality".

The intermediate objective of the programme is “***increased deployment of low carbon technologies in the energy sector***”. The power sector is the largest emitter of CO<sub>2</sub> in South Africa accounting for 50 % of total carbon emissions and a major contributor to the high carbon intensity of the South African economy. The IRP 2010, which was approved by the South African government, identified a development path for the South African power sector that aims to reduce the role of coal and increase the use of renewables in meeting electricity demand in 2030. The programme intends to contribute to the achievement of policy targets for renewable energy by providing capacity building and twinning on technical issues associated to integrating renewables into the power system and assisting in developing the necessary regulatory and planning frameworks to support the successful deployment of renewables in the South African power system.

The achievement of these objectives will be supported through three programme components as outlined below.

## 7 Component 1: Technical assistance to DoE

### 7.1 Component rationale

DoE is the line ministry for the energy sector and thus a key player in shaping the future of the energy policies of South Africa – in particular in relation to power supply. The DoE in its present operation is hampered by lack of capacity in areas of importance for its future role in relation to the introduction of RE in power supply and the implementation of a regulatory framework for energy efficiency. The

envisaged support to training and capacity building will address some of these shortcomings thus enhancing the potential of DoE to take full responsibility for its future roles.

### **7.1.1 Renewable Energy**

The introduction of renewables in South Africa is a major shift in energy policy that will play an important role in reducing the environmental impact of electricity generation, providing a viable alternative to fossil fuels and nuclear generation and contributing towards government policy on promoting a green economy.

The South African government is currently implementing the Renewable Energy IPP Procurement Programme that aims to secure 3,725 MW of renewable energy generation by 2016. The programme awarded 28 projects preferred bidder status in December 2011. A further 19 projects were awarded preferred bidder status in the second round in May 2012. The projects amount to a total of 2460 MW and will be commissioned in the next couple of years. The programme is the initial step in a proposed roll-out of 8400 MW wind power, 8400 MW of solar PV and 1000 MW of concentrated solar power as stipulated in the Integrated Resource Plan for Electricity 2010 - 2030.

If the policy goals stipulated in the Integrated Resource Plan are to be realised it is essential that the Renewable Energy IPP Procurement Programme is extended past the initial 3,725 MW. This requires clearer policy guidelines on renewable energy emanating from the DoE and improvements to the regulatory framework for renewables that will create an enabling environment for further investments in renewable energy and the realisation of the important role renewables can play in the power system and in mitigating greenhouse gas emissions from the electricity sector, which are currently 1 kg/kWh generated. The DoE is currently developing the Integrated Energy Plan which will address some of the shortfalls already identified within the energy sector. This follows a very consultative and inclusive process of all key role stakeholders so that extensive issues on the ground are clearly covered.

Capacity building within the DoE to formulate clear policy on renewable energy deployment is important if the targets for renewables in the IRP are to be maintained and achieved. This involves improving the decision making process in policy development through better use of power system scenarios, analysis of policy alternatives using socio-economic tools, better understanding of the effects of regulation on the power sector, better understanding of the role renewable energy technologies have in the power sector and a more assertive and inclusive approach in policy development. Component 1 will address some of these issues through assisting in the review of the RE White Paper and implementation of both RE and National Climate Change Response white paper through capacity building and twinning that will provide the DoE with access to Danish expertise gained through instigating the similar processes in Denmark.

The revision of the White Paper on RE and alignment with the IRP is an important step towards establishing a comprehensive energy policy framework for RE. This will provide an enabling environment for attracting private sector investments as well as sending a clear signal to utilities on the development path for the power sector and the role utilities must play in achieving this. Further initiatives of involvement of private enterprises in the energy sector will imply that the public administration will need to concentrate on policy and regulatory functions defining the framework for stakeholders to operate.

The development of an implementation strategy for power sector compliance with the NCCRWP is a key step in defining how the power sector will comply with carbon mitigation policy and the initiatives that will be implemented to achieve policy goals on carbon mitigation. The NCCRWP provides the basis from which DoE can develop and implement initiatives for carbon mitigation in the power sector. This is closely aligned to the formulation of the RE White Paper.

### **7.1.2 Energy Efficiency**

Since its inception, the National Energy Efficiency Strategy (NEES) has a strong mandate for monitoring energy efficiency trends. The current NEES set an overall target of 12 % energy demand reduction by 2015. The commercial and public building sector has a target final energy demand reduction of 20 % by 2015 under NEES. However, the achievement of these national energy demand reduction targets has never been measured and reported, even though there were, and still are energy efficiency measures that are being implemented. The absence of an energy efficiency target monitoring system also undermines the DoE's efforts to argue, and secure for fiscal or tax interventions without documentation of facts of progress in achieving the set energy demand reduction targets. These gaps have again been acknowledged and recognised in the 2011 review of the NEES.

The National Response to South Africa's Electricity Shortages published in January 2008 identified smart metering as a medium to long term measure for increasing system security through improving billing, monitoring demand remotely and providing greater opportunities for effecting energy efficiency measures. The Electricity Regulation Act of 2006 was amended in 2008 to incorporate these recommendations on smart metering. The amendment stated that all consumers with a monthly consumption of 500 kWh or more must have a smart metering system and be on a time-of-use tariff by 2012.

Smart meters are currently being installed and utilized by distributors and private companies in South Africa. Many municipalities have already installed smart meters whilst Eskom is carrying out the Load Management Pilot Project in households in Gauteng, Cape Town and eThekweni and has implemented the Demand Market Participation programme, which is based on smart meter technology.

One of the major barriers for implementing a nationwide rollout of smart meters is the lack of a clear regulatory framework to guide the rollout for distributors and clarify

issues related to tariffing, access and protection of data and recouping investments in smart meter technologies through tariffs

NEES recommends that Government should lead the way in implementing energy efficiency measures in public buildings thereby providing examples that the commercial building sector can follow.

The DoE has identified the need for policy development on energy savings in the existing building stock based on experiences gained from energy efficiency initiatives in public buildings as a measure to address some of the issues raised in NEES. This should encompass the use of smart metering technologies in public buildings as they have great potential to help gain a better understanding of energy consumption trends in buildings and provide a means of monitoring the success of energy efficiency initiatives in buildings as well as bringing public buildings in line with the amendment to the Electricity Regulation Act incorporating recommendations on smart meters.

Denmark is sponsoring a small pilot project for the use of smart meter technology and load control technology in the DoE building in Pretoria to gain experience and build capacity in the DoE with these technologies. The project is expected to run from November 2012 to July 2013. The experience gained from this project can be used to determine the needs of the DoE for capacity building in this field and feed into the inception phase of the energy programme for further developing energy efficiency components for the programme. These experiences can be used in policy development as well as feedback to other consumers and provide examples of how energy consumption can be reduced in the existing building stock. This could be highlighted through e.g. an energy efficiency campaign directed at the existing building stock.

## 7.2 Immediate objectives

The immediate objective of component 1 is to ***facilitate the development of a less carbon intensive electricity sector by assisting the DoE develop more comprehensive energy planning capabilities that encompass the efficient deployment and integration of renewable energy and energy efficiency technologies.***

The outputs described under component 1 are based on a list of activities identified and requested by the DoE during the fact finding mission. The prioritisation of identified activities will be finalised during the inception phase together with the DoE. If the SAGEN capacity needs assessment of DoE is published in time it could assist in prioritising and coordinating the activities in component 1 during the inception phase. The activities identified together with the DoE in order to deliver the desired outputs have been extrapolated in the logical framework in appendix 1

An indicative budget for component 1 and the activities and inputs is provided in annex 4. The final budget for each input in component 1 will be finalised during the inception phase.

### 7.3 Outputs

Following discussions with DoE and evaluation against criteria for activities under the Global Framework the long list was reduced and reformulated to the 7 outputs included under component 1. The outputs listed below are an indicative list of the focus areas for the Danish programme. These will be finalised during the inception phase:

- Capacity built in DoE to address critical issues related to integration of RE in national electricity supply.
- A revised White Paper on RE is produced.
- NCCR White Paper<sup>3</sup> implementation strategy for the power sector is completed by DoE.
- Support for a financial expert who can assist in developing and establishment of the financial model of SARI.
- Support for renewable energy training centre – SARETC<sup>4</sup>.
- Capacity building activity supporting policy development and regulation in the field of Energy Efficiency:
  - Policy development on energy efficiency in existing buildings
  - Development of regulatory framework for smart meters
  - Implementation of smart meter technology in public buildings
  - Analysis of energy demand initiatives in public buildings based on smart metering
  - Capacity building of DoE staff on policy development for energy efficiency through twinning with Danish expertise
- National Energy Efficiency Awareness Campaign Strategy.

### 7.4 Activities and inputs

The support to DoE will comprise various packages of technical assistance and capacity building, which will be developed with the view to strengthen internal capacity to address key issues in relation to formulation and review of sector policies. The assistance will focus on facilitating the integration of RE and energy efficiency in the power sector. The Logical Framework developed for the programme in annex 1 is

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<sup>3</sup> The British High Commission recently approved ZAR 1.5 million to assist the NCCR White Paper to start with some initial work which will be in line with the Mitigation Potential Analysis to inform further specific studies and on sector/subsector strategies. This will assist in covering the initiation work to be completed before February 2013. According to the NCCRWP, all sectors have two years to undertake their respective strategies before end of October 2013. The Danish sub component will align accordingly.

<sup>4</sup> University of Stellenbosch is currently working very close with the SAGEN programme in supporting this output. It has to be ensured that there is agreement and alignment of the two programmes. This may also require the involvement of the South African Qualification Association for the accreditation of the programme. Department of Education will advise accordingly of the appropriate requirements.

intended to provide an indication of activities that can be implemented to achieve these goals. These will be finalised during the inception phase.

Capacity building in the DoE will primarily be based on training and twinning between the DoE, the implementing agent and relevant Danish organisations. More information regarding twinning is provided in chapter 10.

## 8 Component 2: Further development of wind atlas in South Africa, WASA II

### 8.1 Component rationale

The activities under this component are to be seen as a logical continuation of the already completed activities under WASA 1 which was regulated through an agreement between the South African National Energy Research Institute (SANERI now changed to SANEDI), Risø/DTU, the Council for Scientific and Industrial Research in South Africa (CSIR), the South African Weather Service (SAWS), the University of Cape Town (UCT). WASA II builds on the work and development undertaken during WASA I which was co-funded by GEF and Danida. In WASA II Denmark will be the sole funder and it is expected that the experience from WASA I will have positive cost implications. In the map below is indicated the coastal areas covered in WASA I.



The contribution to the development of a complete wind atlas covering areas with significant wind potential and South Africa will facilitate that future decisions on introducing wind energy in national electricity supply, as stipulated in the IRP will be on the basis of a better documented wind resource assessment.

Component 2 will deliver a Numerical Wind Atlas and database for the remaining areas of the Eastern Cape (east of Butterworth), KwaZulu Natal as well as parts of the

Free State Provinces that can be used for wind energy planning on national, regional and local scales as well as in support of feasibility studies for wind energy projects. It is also the aim to develop the capacity in South Africa for the large scale exploitation of wind power, including quality wind resource assessment methods and tools, as well as data for the planning of wind farm developments, off grid electrification and extreme wind studies. Component 2 is a complete project on its own that builds on the foundation created by WASA Phase 1.

Further WASA is participating in the development with possible technical assistance to the IRENA Namibia Wind Atlas Pilot Project and with IRENA for visualisation of the Wind Atlas on the CEM Global Solar and Wind Atlas interface.

## 8.2 Immediate objective

The immediate objective of component 2 is to ***further document the national potential for wind power and utilise resource data in strategic energy planning to improve framework conditions for the utilisation of South Africa's wind resources for low carbon transition of the power sector.***

## 8.3 Outputs

The activities under the component will produce the following outputs:

- A wind atlas covering remaining areas of Eastern Cape, KwaZulu-Natal and parts of Free State Provinces
- Continued metering from existing measurement masts established under WASA 1
- Mapping of potential as input to DoE for strategic energy planning purpose
- Collaboration with Eskom on data for day-ahead and in-hour forecasts for wind resources and generation; and
- Input into the Global Solar and Wind Atlas within the Clean Energy Ministerial as coordinated by the International Renewable Energy Agency (IRENA).

The information on wind resources will be published and made available for all stake holders with interest in the sub-sector. DoE will get a much more diversified view on potentials for wind energy as basis for development of RE-strategies. Availability of wind data will help all stakeholders, e.g. Communities, Eskom and IPPs in planning of optimal uses of wind power generation thus reducing transaction costs in the development of projects and response to tenders. Further data can be delivered for necessary forecasts done in Eskom on production from parks.

## 8.4 Activities



Programme activities under WASA Phase 2 will include a big part of the remaining areas in the completion of a nationwide numerical wind atlas for South Africa as a whole and the associated database. This will require completion of wind measurements in most of the areas not covered by WASA Phase 1. Mesoscale wind modelling will be developed for those new areas, and tools will be developed for micro-scale wind modelling and the associated expansion of the wind resource database. Collaboration with DoE and Eskom on utilisation of data will be established to be used by policy makers in relation to grid connection areas and around grid integration planning.

Component 2 is comprised of the following six work packages:

- WP21: Mesoscale Wind Modelling (UCT & DTU). This will produce the Numerical Wind Atlas, validated against measured data.
- WP22: Wind Measurements (CSIR). Five high quality 60m masts will be installed and equipped with measurement equipment. Data will be logged for a three year term and processed for use in WP21 and WP23. The data will be publically available on the internet: [www.wasa.csir.co.za](http://www.wasa.csir.co.za).
- WP23: Micro-scale wind modelling (CSIR & DTU). Five Observational Wind Atlases will be created for selected measurement sites. WP23 is furthermore essential for verification of WP21.
- WP24: Applications for Wind Resource Assessment (CSIR & DTU). Workshops will be held for invited stakeholders (e.g. authorities, planners, developers, banks, scientists, etc.) to raise awareness of the applications for wind resource assessment and develop the capacity to apply the results.
- WP25: Map of estimation of the extreme wind climate of South Africa (SAWS & DTU) for coastal areas of Eastern Cape and KwaZulu-Natal with mesoscale model data
- WP26: Documentation and Dissemination (SANEDI). Collaboration with Eskom on data for day-ahead and in-hour forecasts. National and international capacity and knowledge building through publication of research, wind seminars and research cooperation between South African and international partners. PIU Meetings.

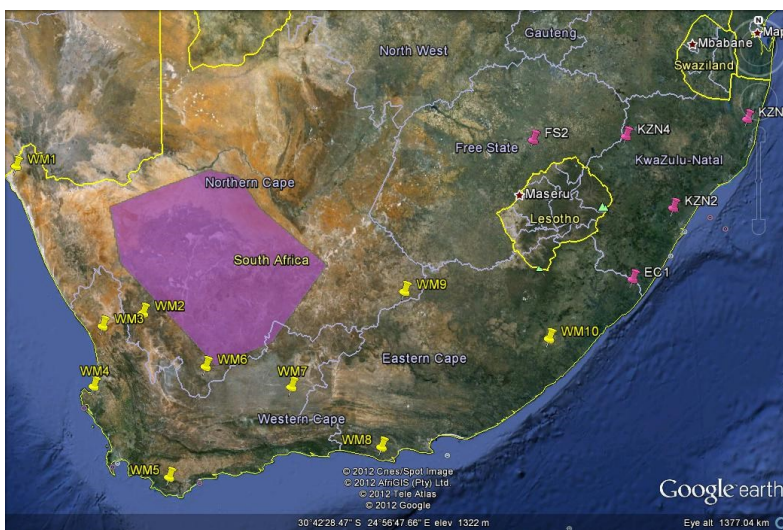
The measurement masts should be installed during 2013, the mid-term workshop will be held during 2014 and the final workshop at the beginning of 2017.

The methodology of the wind atlas modelling lends itself well to expansion to cover an area contiguous to that of the present project. The essential requirement for expansion is that there are additional, appropriately located, measurement masts providing data for the necessary verification of the wind atlas. The data can then be logged, processed and used in the same manner as in the rest of the project and it

follows that the methodology for generation of the wind atlas will be the same as applied to the original modelling domain employing both mesoscale and micro-scale modelling. Likewise, it will also provide output relating to applications for both wind resource assessment and estimation of extreme wind speeds.

## 8.5 Inputs

It is proposed that five 60 metre masts to be installed. At this stage the exact locations of the masts have not been determined, but they will be placed in areas that are representative of the modelled domain.



Locations of the existing WASA wind masts (yellow), and suggested locations of five additional wind masts (pink) for WASA Phase 2.

Additionally it will be necessary to continue with the measurements at the ten existing Phase 1 masts to provide a one year overlap and a reference for Phase 2 modelling.

Technical assistance from Denmark will be delivered according to arrangements between South African and Danish institutions similar to those under WASA 1. TA could include twinning on developing wind atlas and database with Danish counterparts, and twinning on modelling of wind resources with Danish counterparts.

A Project Steering Committee, comprising DoE, SAWEP, MCEB and SANEDI, is established to guide the implementation of the project. A Project Implementation Unit (PIU) comprising SANEDI and the implementation partners are responsible for the implementation of the project The PIU Chair reports to and is a member of the Project Steering Committee.

## **9 Component 3: Technical assistance to Eskom for RE integration**

### **9.1 Component rationale**

South Africa has a well-developed electricity system; however, it is designed and managed for the benefit of large, centralised coal-fired power plants. The introduction of RE, and especially wind power, in the coastal regions will fundamentally change the dynamics of the South African electricity system. Most of the new RE generation will be situated away from the traditional generation centres in the north and east of the country, and closer to important load centres in coastal areas that are currently supplied through long transmission lines. This development will require new ways of thinking in energy planning and system operation in South Africa.

Managing new variable power production from RE – including wind power from IPPs is a relatively new challenge internationally with few countries having experiences in the efficient integration of high levels of RE. In South Africa there is no experience with managing and operating the powers system with RE (apart from the experience of the Darling Wind Farm).

Challenges also exist in long-term planning on how to integrate RE based electricity in the IRP and managing the phasing in of large volumes of RE over time. Eskom is aware of the challenges associated with integrating RE, but does not currently have the necessary expertise to deal with these challenges or access to expertise locally.

As the level of variable generation in electricity systems increases so it brings with it new challenges for system operators in ensuring a stable and secure supply of electricity to end users. When wind turbines were small, low tech machines could be connected to the grid with no notable effect on the power system. The growth in the level of wind power in many electricity systems together with the technological advances in wind turbines has resulted in wind power having an ever increasing influence on electricity systems.

The deployment of wind turbines in large numbers often raises fears that they will destabilise the power system resulting in increased grid failures and large investments in regulating power. These fears are often based on misconceptions, but they can result in recommendations that the level of wind power in the grid be restricted to a relatively low level.

Ensuring the dependability of a power system requires planning over different timeframes. This can vary from years to seconds before actual generation and consumption. Policy and power system planning must find a balance between security of supply, economic efficiency, environmental concerns and socio-economic factors. In order to achieve this, power system models are often used.

Strategic grid planning and system planning are two different levels of planning. Strategic grid planning must ensure that investments in the grid are made that benefit

the end user by providing for a more efficient use of the transmission grid and thereby reducing the overall cost of supplying electricity to the end user.

System planning for RE is a technical form for planning that is used to determine and prepare for the technical implications of implementing strategic planning decisions. Strategic grid planning should preferably be carried out using least cost dispatch models, whilst system planning or grid planning should be carried out using power system simulators that carry out dynamic and static state studies.

Eskom shows a large commitment to ensure the deployment of RE in the RSA power grid. They are preparing a number of wind farms from which Eskom Renewable Energy Investment Project co-funded by the Clean Technology Fund (CTF) and AfDB, will provide 100 MW. Eskom is also deeply involved in the Renewable Energy IPP Procurement Programme as the purchaser of the generated electricity through Power Purchase Agreements, as provider of a reliable infrastructure (grid and substations) and the responsibility to balance the power system. The process has required a large effort from Eskom. As the provider of the infrastructure Eskom expressed a need for guidance in the implementation of the Integrated Resource Plan for Electricity by building up expertise in long term power development planning to meet the demands of future wind farms and other RE projects to be connected to the grid. This long term planning would be relevant for DoE as well as for Eskom.

The component is to take into account an open dialogue and information access to DoE on all activities undertaken.

As Eskom is a public limited liability company it is expected that Eskom will cover its own personnel's costs for domestic and international travel, food and accommodation and man-hours associated with twinning and other training activities under the programme when these activities are executed in South Africa, Denmark or a third country.

## 9.2 Immediate objective

The immediate objective of component 3 is to ***maximise carbon mitigation through the efficient planning and technical integration of renewable energy technologies into the South African power system***. This will be achieved by maximising the utilisation of RE generation output in the grid and the inclusion of renewable energy in strategic planning on an equal footing with conventional generation.

The outputs described in component 3 are based on dialogue with various departments and divisions in Eskom that took place during the fact finding mission and subsequent to the team returning to Denmark. The list of activities in the Logical Framework in appendix 1 should form the basis for component 3. Their implementation and prioritisation must be finalised together with Eskom during the inception phase.

An indicative budget for component 3 and the activities and inputs under this component is provided in annex 4. The final budget for each input in component 3 will be finalised during the inception phase.

### **9.3 Outputs**

Technical capacity will be built in Eskom with the aim to develop internal Decision Support Tools for planning and operations in close dialogue with DoE within key areas. The German SAGEN programme will also provide technical assistance to Eskom on the integration of renewables. The Terms of Reference for the German programme have been considered when developing the Danish programme so as to avoid overlapping and competing programmes. Developments in the implementation of these programmes should be assessed and coordinated throughout the implementation phase so as to ensure relevance of capacity building for Eskom.

The outputs listed below are an indicative list of the focus areas for the Danish programme based on dialogue with Eskom taking the SAGEN programme into consideration. These will be finalised during the inception phase.

- Integration and simulation of renewable energy technologies in the Integrated Resource Plan
- Integration and simulation of transmission in Integrated Resource Plan
- Methodology for identifying strategic investments in transmission planning
- Development of system planning in Eskom
- Standards and guidelines for system operation with variable generation
- Identification of flexibility and reserves for integrating variable generation
- Development of fast track procedures for small projects in Grid Access Unit

### **9.4 Activities and inputs**

Support to Eskom will comprise various packages of technical assistance and capacity building, which will be developed with the view to strengthen internal capacity to address key issues relating to strategic planning with renewables and the integration of renewables into the power system. The Logical Framework developed for the programme in annex 1 provides a list of activities developed in conjunction with Eskom that should be implemented to achieve these goals. The prioritisation of activities will be finalised during the inception phase.

Capacity building will be based on twinning between Eskom, the implementing agent and Danish organisations as described in chapter 10. The inputs for the components will be more precisely defined during the inception phase, but will be based on the overarching elements described in the Logical Framework in annex 1.

Financing of all related technical assistance for the above activities carried out by international consultants, including twinning arrangement with relevant Danish institutions and the cost of arranging for capacity building through transfer of Danish experience via training events in RSA and to some extent at the participating institutions in Denmark, will be covered by the programme. When planning for training activities South African regulation on e.g. skills development and black economic empowerment will be taken into account.

As Eskom is a public limited liability company it is expected that Eskom will cover its own personnel's costs for domestic and international travel, food and accommodation and man-hours associated with twinning and other training activities under the programme when these activities are executed in South Africa, Denmark or a third country.

## **10 Technical Assistance**

### **10.1 Approach to use of Technical Assistance**

The use of technical assistance in the Programme is informed by the Danida policy on Technical Assistance in the AMG. Programme advisors are to be strategically located to support the programme implementation as technical advisors.

The advisers shall not substitute management requirements in the supported institutions but the assistance to institutional development will also include internal capacity building in required areas.

The key principles for employment of other short or longer term TA will be developed further during the inception phase. The principles for deployment of TA will include:

- Each input of TA shall have a clearly defined counterpart, i.e. an identified client or representative of multiple clients.
- The client cannot be advisors already engaged under the Programme.
- No input of TA will commence without ToR signed by the responsible Component Manager.
- Upon beginning an assignment, the consultants shall present a detailed work plan for their activities to the client procuring the services.
- It is the responsibility of both consultants and the client that there is no duplication of work that has already been done.
- It is the responsibility of the client and component managers to circulate within the programme information on specific TA input and availability that may be useful to others.

Capacity building will take place in different forms: on the job training via either support from MCEB, other authorities or via private consultancy, dedicated training courses or workshops provided by and arranged either by MCEB or foreign or local institutes/consultant companies.

Consultants providing short-term TA shall prepare brief minutes of meetings with counterparts and departments/organisations to be signed off by the authorised person on the programme.

Before the completion of each assignment the consultant shall deliver a report to the client within the specified period in line with the project timeframe. The report will form the basis for a debriefing session with the client and relevant national, provincial and municipal staff and other stakeholders.

## **10.2 Twinning**

Twining could be preferred due to the success that this form of capacity building has had between Danish and South African institutions in the field of renewable energy since the renewable energy programme was in its infancy.

Twining is a capacity building tool that provides direct exchange of experience between organisations through the practical implementation of specific tasks. Twining is a two-way process where organisations work together to share information and knowledge in order to foster collaboration and partnership and, thereby, strengthen the capacity of the organisations to carry out their responsibilities. Identifying twining activities is generally based on the strengths of the one organisation and the requirements of the other. Twining generally includes the secondment and attachment of staff between the participating organisations.

The benefits of twining are the building of capacity and the transferring and entrenchment of skills and knowledge in the participating organisations through carrying out projects whereby the benefactor leads the process. Twining allows for sharing of best practice approaches and encourages collaboration on developing and improving techniques and methodologies for carrying out relevant tasks. Twining builds relationships between organisations that allows for organisations to work together on specific issues and utilise each other's expertise.

Two fundamental principles of twining are that:

1. Twining results in mandatory and concrete results
2. The twining project is carried out and managed by the organisation that ultimately has responsibility for delivering the output. In this case the SA government through DoE and its State Owned Entities such SANEDI & Eskom, etc.

Danish experience in South Africa indicates that twinning is a good methodology for cooperation with South African counterparts due to the generally high level of skills and education in South Africa. The DoE has made great strides in introducing transparent policy development through extensive consultative processes in policy development e.g. the policy adjusted IRP 2010 and the RE-IPP Procurement Programme, which have been successful. South Africa, however, does not have much practical experience with implementing renewable energy deployment as yet. Twinning can assist South Africa move from successful policy development to successful deployment of RE by combining training with technical assistance and focusing on training individuals as well as encouraging organisational learning and capacity building. This anchors capacity building at two levels and provides a greater chance for long term success.

Financing of all related technical assistance for the above activities carried out by international consultants, including twinning arrangement with relevant Danish institutions and the cost of arranging for capacity building through transfer of Danish experience via training events in RSA and to some extent at the participating institutions in Denmark, will be covered by the programme. When planning for training activities South African regulation on e.g. skills development and black economic empowerment will be taken into account.

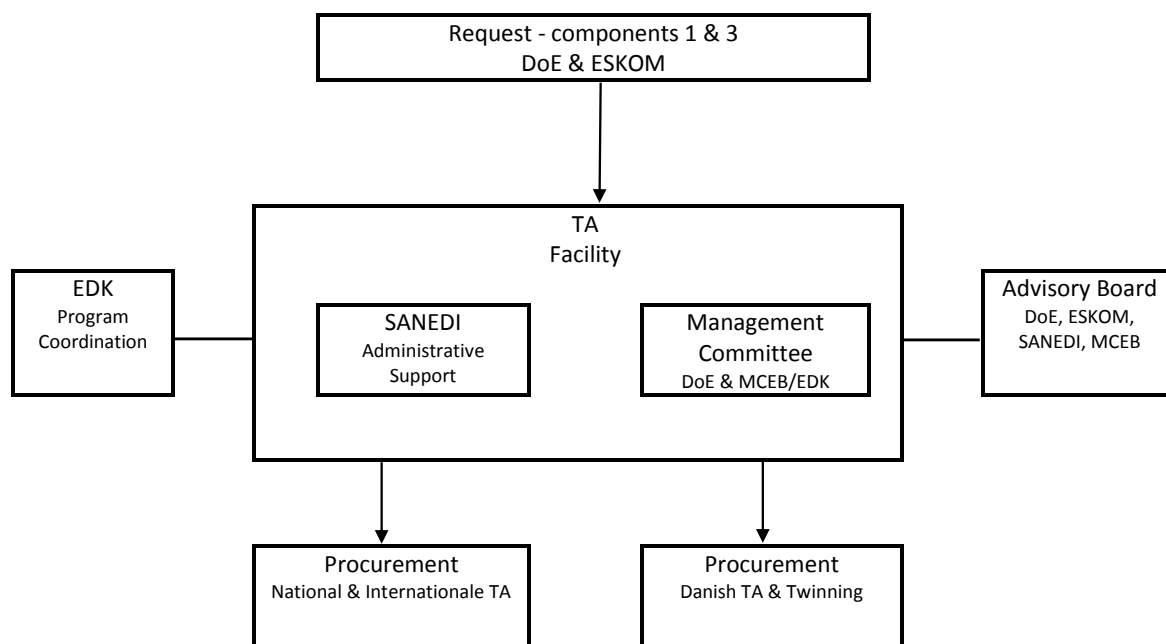
As Eskom is a public limited liability company it is expected that Eskom will cover its own personnel's costs for domestic and international travel, food and accommodation and man-hours associated with twinning and other training activities under the programme when these activities are executed in South Africa, Denmark or a third country.

Twinning arrangements between Danish and South African institutions or authorities will follow the EU Guidelines for twinning arrangements.

### **10.3 Management of Technical Assistance**

The provision of TA for component 1 (DoE) and component 3 (Eskom) will take place through a TA facility, that will receive applications from the partners within the scope of the two components. The TA facility will have a lean set-up with day to day decisions taken by a Management Committee (MC) consisting of the DoE director for RE, DoE Director for Energy Efficiency and a representative from MECB. An outline of the TA Facility is illustrated below:





The detailed layout of the TA facility is to be further refined during the inception phase.

Based upon ToR for requested TA assignments, the Management Committee will, eventually based upon consultations, take decision on the eligibility for funding as well as the procurement method. Assignments may be met by national or international procurement of short/long term TA using South African procurements rules, by procurement in Denmark of Danish short/long term TA, following EU-regulations or eventually by setting up twinning arrangements between Danish and South African institutions or authorities, using the EU Guidelines for twinning arrangements.

SANEDI will provide assistance in the daily operation of the facility, providing basis for the Management Committee to take decisions. This will include initial screening of ToR, setting up tendering and procurement of TA services, financial management of TA assignments, monitoring of outcomes and report back to the Programme Coordinator. This will ensure basis for proper input to the financial management system and databases of the Danish Ministry of Foreign Affairs.

SANEDI will establish a dedicated account in a commercial bank for deposit of all funds received from EDK, and will be responsible for preparing the necessary accounts according to agreed standards.

The support from SANEDI will be governed by a service contract to be entered with DoE and approved by the Management Committee. SANEDI will be compensated for its services based on a fixed administrative fee (maximum 5% of the TA portfolio from components 1 and 3).

The TA facility shall be designed in such a way that it opens for the opportunity of channelling additional funds from Denmark or from other development partners to RE related activities in RSA.

#### **10.4 Technical assistance during the Inception phase**

During the Inception period DoE and participating institutions may receive support from a short-term Process Consultant, who will be engaged by MCEB to assist in initial programme mobilisation in general and in the preparation of an Inception Report. The support from the consultants shall not be limited to DoE but also include support to SANEDI and Eskom. The need for this assistance will depend on how early it will be possible to arrange for the establishing of the Management Committee and the initial TA to DoE. The cost of these advisers will be included in the programme budget.

### **11 Measures to address cross-cutting issues**

Cross cutting issues to be considered and addressed by the programme include all socio-economic issues as guided by the Constitution of the RSA and supporting legislative framework such as poverty, gender equality, environment, and governance.

#### **11.1 Poverty alleviation**

Unemployment in South Africa is, according to the official statistic approximately 25 %, affecting the youth disproportionately with unemployment rates of up to 50%. Fighting unemployment is one of the South African Government's top priorities. The energy sector itself has the potential to generate employment, as new jobs will be created when the electricity sector expands to meet its demand for new investments. The introduction of renewable energy in particular can create new jobs. A recent study evaluated the role that renewable energy could play in job creation. Meeting the projected electricity demand for the year 2020 in accordance with the stipulations in the IRP will create around 52 000 jobs, compared to 43 000 that would be created if the additional capacity were created solely by coal-fired plants. An even larger number of jobs (57 000) would be created if RE technologies alone were to generate power to meet the additional future demand. Furthermore, the introduction of renewable energy will contribute to ensuring access to energy to the approximately 20% of the South African population, which still do not have electricity in their homes.

#### **11.2 Gender equality**

Official policy, laws and regulations in RSA provide equal opportunities for men and women. Equal employment opportunities and sharing of resources are stated government policies. Women are gaining ground - especially in urban areas - where young women are equally well educated as men.

Part of the future power demand relates to the plans to bring electricity to all rural areas. Women in rural settings are often head of household because the rate of male migration is higher than that of female. Access to electricity will have major benefits

for women and children as the provision of electricity in rural areas has considerable potential to improve the lives of women in many ways, in their domestic and market work as well as their communities. Positive socio-economic impacts of rural electrification on women are well-documented, ranging from time saving, employment, and education, to safety and maternal health.

### **11.3 Environment**

More than 90 % of present power generation in RSA is based on coal. The high dependency on coal results in high emission of sulphur from power plants, which in turn causes acid rain and smog with soot particles. Acid rain reduces agricultural yields and damages buildings and infrastructure. The poorer segments of city populations are relatively more affected by air pollution due to generally cramped and unhealthy housing conditions and will benefit most from a healthier environment.

The increasing share of RE will gradually reduce GHG emissions and thus contribute to a slower pace of climate change and air pollution. A higher share of RE will in the medium to longer term have an impact on the ambient air quality and thus contribute to mitigating the negative impacts on human health and to natural resources quality.

### **11.4 Democratisation, human rights and good governance**

An important aspect of good governance in relation to RE is to obtain a reliable information base, which could serve as a basis for policy development and strategic planning. The programme will support the collected RE-related data from all parties on RE (resources, generation capacity, and energy production), undertake analysis, develop scenarios and generate value-added reports dealing with the policy framework, the regulatory environment, RE technology, business practices, etc.

## 12 Budget

The tentative budget for Danish support to renewable energy development and energy efficiency in South Africa is 40 million DKK. The allocation of funds to each component as described in the programme document will be determined in the inception phase and during the course of the programme in accordance with the needs of the DoE and Eskom.

**Table 2: Budget estimate for 2013 – 2015**

	DKK
<b>TA Facility:</b>	
Component 1 (DoE) (indicative allocation) <sup>56</sup>	18.750.000
Component 3 (Eskom) (indicative allocation) <sup>1</sup>	6.750.000
Administrative support (SANEDI)	1.125.000
<b>WASA II:</b>	
Component 2 (SANEDI)	12.000.000
<b>Program Coordinator (3 years)</b>	1.375.000
<b>Total</b>	<b>40.000.000</b>

Se Annex 4 for details

## 13 Organisation and management

### 13.1 Institutional setting

The key government institutions involved in the sector are the Department of Energy under the Minister for Energy and Eskom a state owned holding company under the Minister for Public Enterprises and SANEDI a State Owned Entity under the Ministry of Energy. The Minister for Energy heads DoE and appoints the National Energy Regulatory Board who works through the National Energy Regulator of South Africa (NERSA).

The key roles of DoE are to prepare and propose energy policies and associated legislation. NERSA develops the regulatory framework for the sector and governs the electricity sector according to legislation prepared and enacted by DoE.

<sup>5</sup> Any need for reallocation may be considered by the inception review

<sup>6</sup> 3 million DKK is allocated to an Energy Consultant to be tendered in Denmark - Exact amount to be determined

Eskom is responsible for electricity generation and transmission and distributes electricity within the framework developed by NERSA.

SANEDI was recently transformed from an institution only dealing with non-nuclear energy research and development to one that has a development and energy efficiency implementation mandate. Furthermore SANEDI has been the executing agent of WASA 1 comprising the first phase of the wind atlas.

### **13.2 Energy Consultant and Programme Coordinator**

To facilitate the programme an Energy Consultant will be posted in Pretoria to spearhead the provision of policy advisory services on renewable energy and energy efficiency through close cooperation with the DoE and MCEB. The Energy Consultant will provide advice and support on overall programme management and furthermore, as a key task, in particular be involved in capacity building and the implementation of activities within DoE and the National Electricity Company, ESKOM in relation RSA climate strategy and energy planning issues. The Energy Consultant will participate in the Management Committee and the Advisory Board.

Further a Programme Coordinator will be employed by and work from the Danish Embassy in Pretoria. The Programme Coordinator will be working as a staff member at the Danish Embassy in Pretoria under the overall supervision of the management of the Embassy while receiving instructions and guidance on programme specific issues from MCEB, report to MCEB on the management of the programme, including flagging issues that require urgent strategic direction. The Programme Coordinator will further deal with financial and administrative issues with the relevant entities in the Danish Ministry of Foreign Affairs, and be responsible for the daily programme related dialogue with the South African partners. The main duties of the Programme Coordinator also involve assistance in monitoring the progress of the Danish programme, and enhance donor coordination as well as to provide advice and support on overall programme management.

It is foreseen that the Energy Consultant or the Programme Coordinator will represent MCEB in the Management Committee, if MCEB is not directly represented. Furthermore the Program Coordinator will function as secretary for an Advisory Board. See Annex 5 -Draft ToR for the Programme Coordinator, and Annex 6 - Draft ToR for the Energy Consultant

### **13.3 Management Committee**

The programme will be implemented by a joint Management Committee to be established in close collaboration between DoE representing the Government of RSA and MCEB representing the Government of Denmark.

The programme will be managed jointly by the South African Department of Energy (DoE) and MCEB, who each will appoint a representative for the Management Committee. MCEB can delegate the responsibility if deemed relevant.

It should be emphasised that South African National Energy Development Institute (SANEDI) is responsible for the daily operations of a facility for Technical Assistance (TA) – with supervision from the Programme Coordinator enabling the Management Committee to take decisions.

MCEB will closely follow the project implementation through participation in the Advisory Board, contact through the Energy Consultant and Programme Coordinator and through reviews.

A set of policy tool kits are being developed by the LCTU within the MCEB which will also be made available to DoE (and which can be adapted to special needs identified during the project implementation), networking between experts will be encouraged and MCEB will conduct reviews of the project where knowledge sharing is also planned to take place, e.g. in the form of site visits, seminars and workshops, policy dialogues, etc. MCEB will ensure that Danish competencies in RE are made available to DoE by drawing on the relevant experts in the different departments within the ministry as well as through short term expert consultancies from MCEB staff financed from RSA program budget. MCEB will participate actively in the Advisory Committee, and MCEB will co-operate closely with DoE, SANEDI and ESKOM to identify where the Danish knowhow is particularly relevant in order to also promote the longer term goal for RSA energy policy and commitment made in the RSA-DK MOUs and LoIs. Finally, Denmark supports a number of international climate networks (the PMR, CCAP MAIN, the Nordic NAMA Partnership initiative, baseline work with UNEP Risoe and OECD) where MCEB is actively engaging in the work and where RSA is also present – MCEB will make sure that these synergies are utilized to the extent relevant.

DoE will appoint a Programme Director for RE and EE respectively with responsibility for day-to-day management and coordination within the Unit in DoE where the project is located. The programme Director will represent the Government of South Africa in the Management Committee. The Programme Director will report to the Chief Director: Clean Energy on the management of the programme including flagging issues that require urgent strategic direction as well as what needs DoE's decision, particularly on measures that require the intervention of the Management Committee (MANCO and Extended MANCO), Executive Committee (EXCO), Director General and the Ministry Principals within the Department of Energy as is the case with other programmes of cross cutting nature in terms of national mandates. This will include provided support to the Chief Director on progress on the

programme which needs to be filtered through other government structures as required of the DoE's mandate, that is, parliamentary committee updates, Directors General's forums/clusters, etc.

For each component the responsible implementing institution will appoint a Component Manager, who shall be responsible for day-to-day management. The Component Managers shall liaise with the Management Committee<sup>7</sup> on important issues and shall be responsible for elaboration of budgets and work plans, financial reporting, and scheduled progress reporting.

### **13.4 Advisory Board**

A Programme Advisory Board (AB) will be set up with the view to secure overall programme management. The Program Coordinator will function as secretary to the Advisory Committee. The Advisory Committee will meet at least bi-annually but may be called by the Management Committee on demand.

The members of the AB shall comprise representatives from participating government departments and other relevant institutions in RSA and Denmark in senior management positions without direct involvement in 'day-to-day' programme management. The AB shall be chaired jointly by the Chief Director, Clean Energy of DoE<sup>8</sup> and a representative from the MCEB of Denmark. AB further includes representatives from; EDK represented by the Programme Coordinator, Eskom, SANEDI, and other relevant authorities.

The component managers shall participate in the AB meetings in their capacity as resource persons.

The AB will discuss and make recommendations on programme management as follows:

- Work plans and budgets including engagement of TA.
- Monitoring of programme implementation.
- ToR for audits and of audit reports, as well as monitoring of audit follow-up.
- ToR for reviews and on endorsement of review recommendations.
- Advice on decisions regarding deviation from plans laid down in programme documentation, including reallocation of funds, changes in outputs, indicators,

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<sup>7</sup> The Chief Director Clean Energy in DoE in alternate to the Danish Counterpart will Co-Chair the Management Committee which upon his/her absence this role could be delegated to the Acting CD or one of the respective Programme Directors in DoE on Danish representative respectively.

<sup>8</sup> Noting that the DoE is currently under restructuring with the current Chief Directorate being elevated to Branch level which is headed by a Deputy Director General (DDG) which reports directly to the DG and is part of most of the executive committees in the DoE and in line with other external government structures. The new DoE organisational structure is nearing completion and could be implemented before March 2013. This further demonstrates firm commit of the South African Government through DoE of acknowledging the huge role of the unit hence the full expansion at a branch level instead of a Chief Directorate.

- activity plans, etc.
- Any other issue with bearing on programme management as found relevant.

### **13.5 Inception phase**

The inception phase will start on April 1, 2013 and will have duration of up to 6 months. Initiating the program activities must be weighed up with the additional value of a 6 month inception phase. E.g. the inception phases for components 1, 2 and 3 could run separately allow for one component to start whilst other components still are being finalized.

The outcome of the inception phase is detailed working plans and budgets approved by the DoE, and the MCEB, will enable the launch of overall management at programme level as well as within each component.

During the Inception Phase the key issues below are to be addressed:

- Establishment of Programme Advisory Board and holding inaugural meeting to approve its ToR and other business
- DoE, SANEDI, and Eskom to appoint component managers
- Development and agreement of the financial management system and flow of funds mechanism in relation to each component managed by SANEDI.
- Preparation of an operational manual including procedures for tendering and contracting of external service providers managed by SANEDI.
- For each component an inception report will be prepared (guided by the AMG for Programme Management). The report will include an elaboration of an implementation strategy including work plans and budgets.

An inception review report is to be formulated by mid 2013.

## **14 Financial management and procurement**

The funds for the programme derives from the general Danish ODA budget, out of which DKK 1.2 billion has been earmarked for commitments to climate mitigation activities in developing and middle income countries for a two years period. Some of those funds are transferred from the Danida budget to the MECB who will take responsibility for the preparation and management of targeted programmes.

The 27 September 1996 “Agreement between the Government of the Kingdom of Denmark and the Government of the Republic of South Africa Regarding the Danish assistance Programme to South Africa” outlines the modalities for the Technical Assistance.

### **14.1 Overall financial management**



The final modalities for disbursement, management and procurement of the climate funds are not fixed to a single set of rules leaving several options open. These options include:

- National or international procurement of short/long term TA using South African procurements rules.
- Procurement in Denmark of Danish short/long term TA, following EU-regulations.
- Setting up twinning arrangements between Danish and South African institutions or authorities, using the EU Guidelines for twinning arrangements.

The decision depends on the activity and will be decided during the Inception phase.

At this stage the following modalities for financial management are proposed:

#### **14.2 Component 1:**

International Advisers will be recruited by DEA/MCEB based on agreed Job Descriptions/Terms of Reference. Evaluation of candidates and decision on who to employ will be a joint decision between DEA/MCEB and DoE. The cost of these advisers will be covered from the programme funds and managed by DEA/MCEB.

#### **14.3 Component 2:**

The financial management procedures for this component (WASA 2) will follow the procedures used in the previous phase (WASA 1). This implies that SANEDI shall act as financial manager (Fund Manager) for the Component, while at the same time being party to the cooperation agreement between all participating parties.

The participating parties namely SANEDI and RISOE and associated institutions in South Africa such as CSIR, University of Cape Town, and the South African Weather Service (SAWS) as well as other national or regional institutions shall enter into a formal agreement on their cooperation. The agreement shall clearly define the roles and responsibilities of each partner in relation to an agreed work plans and budgets endorsed by the Programme Steering Committee.

The agreement between participating parties shall refer to sub-agreements between SANEDI and each partner providing clear definition on the inputs to be provided, activities to be carried out and tangible outputs to be delivered within agreed timeframes and budgets.

All parties shall establish an account in a commercial bank or confirm their existing accounts with the commercial banks making it possible for payments for work done be transferred into the bank account of the appropriate party.

#### **14.4 Component 3:**

As Eskom is a public limited liability company it is expected that Eskom will cover its own personnel' costs for domestic and international travel, food and accommodation and man-hours associated with twinning and other training activities under the programme when these activities are executed in South Africa, Denmark or a third country.

## **15 Monitoring and reporting**

A monitoring system will be set up with a view to secure full transparency in programme management. Quarterly and annual reports will be prepared by the Management Committee supported by SANEDI. The monitoring will be based on periodic reporting as follows:

### **15.1 Quarterly Reports**

Will be produced by each component and shall include:

- Progress to date as compared to work plans
- Progress to date compared to output targets for the entire programme period
- Reporting on expenditure as compared to budgets
- Reporting on the linkage between output and expenditure
- Specification of recommended changes and adjustments (including budget re-allocations) for approval by the relevant authorities and the AB.

### **15.2 Annual Reports**

Annual reports will be produced by DoE in the format to be agreed by the parties on the basis of input from each component. The first report shall be available as input to the Joint Mid-term Review and shall in addition to the quarterly reports address the following issues:

- An assessment of the development of the national framework during the past year
- Progress as compared to the defined (original and revised) output targets for the reporting period, including brief explanations of problems encountered and how these have been handled
- Based on available national statistics the following general indicators for the impact on gender equality and environment are to be included in the Monitoring and Evaluation system of the programme:
  - Renewable energy impact on job creation and access to electricity.
  - Renewable energy impact on reduction in GHG emissions and air pollution that in turn contribute to mitigating the negative impacts on human health.

The third annual report shall be prepared in a format which will meet the requirement for a Programme Completion Report.

In preparing these reports programme management shall be guided by the Danida Aid Management Guidelines for Programme Support.

All relevant information leading to policy decision will be available for the public.

## **16 Auditing, reviews and evaluations**

Funds managed in the RSA shall be subject to internal national auditing procedures. In addition the Danish side will arrange for annual auditing according to standard DANIDA procedures in relation with annual reports. Finally the Government of RSA by entering into the final agreement on the Program shall observe the right of having all program accounts audited by the Auditor General of Denmark.

Funds managed by DEA/MCEB shall be subject to normal Danish auditing requirement for the public sector and the outcome being shared with the other parties of the programme.

A review mission by DEA will take place at the end of the Inception period. The objective will be to assess and make recommendations on work plans and budgets, on the procurement and financing modalities for each component, and on a joint strategy for mobilisation of the identified TA inputs.

A mid tem review is expected to take place in the beginning of 2014. The review will make an assessment of progress and will make recommendations to the PSC, based upon observed performance, for re-allocations of budgets across components, and across partner organisations within components. The review may also make recommendations to the PSC on possible adjustments to specific outputs, and recommend to the PSC on the inclusion of additional activities deemed necessary to achieve the expected outcomes.

Evaluations may take place after the programme has been completed. Evaluations are the remit of the Evaluation Department of Danida and may be decided and planned at the discretion of same.

## **17 Assumptions and Risks**

### **17.1 National and Programme level**

#### **17.1.1 Assumptions**

A key assumption for the Programme is that RSA maintain its political will to implement its stated strategy for a low carbon transition including the set targets for 2030 in terms of carbon emission and RE in overall electricity supply in line with the Copenhagen Accord/Cancun Agreements. Furthermore it is assumed that the South African government through DoE, National Treasury Eskom, and other relevant institutions takes full ownership to the IRP2010 as a joint strategy for sector

development. Finally it is assumed that economic development in RSA continues at its present level.

### **17.1.2 Risk and risk mitigation**

The Government appears to have a strong commitment to deliver in accordance with its present climate mitigation commitments. Government support to the present programme will be an indication of that commitment, and the programme in itself should be seen as a contribution to maintaining the momentum. The greatest risk is if the present economic crisis has unexpected negative effects causing difficulties in securing sufficient resources required for the planned sector investments. This risk, however, appears to be low although there is a risk that some of the IPP's can't raise the needed capital before the deadline, imposing a risk that installed capacity from IPP cannot reach its targets.

## **17.2 Component 1**

### **17.2.1 Assumptions**

It is assumed that DoE has commitment and capacity to take responsibility for overall programme coordination in general and for implementing the activities under its own component. The planned training and capacity building activities will only produce the expected outputs, if qualified staff is available and if relevant staff is allocated to the reportedly many open positions in the organisation. It is assumed that DoE management is committed to take a lead in ensuring a proper coordination of TA from different development partners in order to minimise the risk of overlapping of activities and maximising the benefits. It is further assumed that a revision of the RE White Paper remains priority of DoE, that input to implementing the NCCR White paper remains priority, and that DoE continues work with complying with the NCCR White Paper with an intent to establish a sector strategy .

### **17.2.2 Risks and risk mitigation**

The transfer of SARi from DTI to DoE, can be seen as a confirmation of the intention of Government to have DoE play a key role in relation to RE and a vote of confidence in its ability to fulfil this role.

In order to mitigate the risk of bigger delays in implementing the programme it is proposed to establish a sub Committee to the of the Existing Energy Planning Project Steering Committee. The Macro level organisational structure for the DoE has already been approved by both the Minister of Energy and the Minister of Public Administration and is under implementation with the current Chief Directorate being elevated to Branch level which is headed by a Deputy Director General (DDG) to report directly to the Director General of the Energy. The DDG is part of most of the executive committees in the DoE and in line with other external government structures in Directors General Clusters/for a, Parliamentary processes. This further demonstrates a firm commitment of the South African Government through DoE of acknowledging the huge role of the unit task in addressing the Clean Energy sector in

the country hence the full expansion at a branch level instead of a Chief Directorate. The expansion will certainly boost the required human capacity by further implementation or the filling of posts within the Clean Energy Branch Structure. It is expected that posts will be filled as early as mid-2013.

An input to address this risk will be to consult the newly finalized capacity assessment of DoE, done as a part of the GIZ support to DoE and input to their provision of short and long term TA. The capacity assessment and the process to follow may give important indication on how to balance external TA with absorption capacity in DoE.

Some of the bigger tasks e.g. development of white paper on RE, should be led by DoE and comprise other relevant government departments, Eskom, expert institutions and other major stakeholders.

Further the Government Agreement can be recommended to include a clear statement on the expected commitment on the side of the Government of RSA to ensure that sufficient internal resources are available to ensure that DoE has adequate absorption capacity to take full benefits from the assistance. The risk of non-commitment to pursuing the completion of the various policy documents appears to be low.

The implementation of the Organisational Structure is one mitigation option as indicated above and affirming a clear statement required by this. The post of the Deputy Director General Clean was advertised in May and Closed in June 2012. The process of filling it is in progress. Finalisation of the lower level posts for the three Chief Directorates: RE, EE and Climate Change and Designated National Authority for CDM are progress as well.

## **17.3 Component 2**

### **17.3.1 Assumptions and Risk**

Out of the 10 masts in operation for 2 years - 3 incidents of theft has occurred. The masts are not disappearing - theft is isolated to the equipment attached to the masts in particular solar panels, and secondary the batteries (less visual). Theft is not isolated only to WASA masts equipment.

Several mitigation options are now being built into the design and installation of WASA Phase 2 masts.

### **17.3.2 Mitigation options, utilised, investigated**

- Insure all masts and equipment
- Make the wind measurements masts less attractive for theft. I.e. try to get rid of the need for solar panels and batteries. Already the solar panel for the navigation light is being replaced with self contained led navigation lights with their own built-in solar panels on top (smaller, less visible solar panel).
- Exploring solar panel tracking technology – built in solar panel electronic devices that are activated once the solar panel is moved and can be tracked for some time.
- Exploring replacing the data controller solar panel with a CSIR proprietary design small “wind turbine” generator placed at the top of the mast that would also do away (can generate in night time as well) or lessen the need for a battery.
- Having a sufficient, but realistic contingency budget available. Civil Aviation regulations require that the navigation lights are operating at all times. It is therefore important e.g. in the case of theft and the navigation light not working, for the maintenance team be able (have a budget) to apply 1<sup>st</sup> hand repairs to keep the navigation light operating while a longer term solution is considered.
- Leverage buy-in from the targeted Provincial Governments of the Eastern Cape, KwaZulu-Natal and Free State for its support and contribution to the security and maintenance of the WASA Phase 2 wind measurement masts and equipment to be erected in its respective Provinces.

## **17.4 Component 3**

### **17.4.1 Assumptions**

Eskom appears to be a well-staffed and professional organisation, but the requisite expertise on integrating RE is a new activity where experience is relatively limited. Eskom is aware that the transition from coal to use more RE in power generation will require the development of new internal competencies and the benefits they can have from getting access to Danish experience in that field. Eskom’s engagement in cooperation projects involving interactions with Danish power utilities and consultants has played a role in the challenges of integrating RE into the electricity grid. The programme will also focus on capacity building with System Operations and Energy Planning and Transmission division. It is anticipated that Eskom and DoE can establish positive working relations in order to secure the expected synergies.

As Eskom is a public limited liability company it is expected that Eskom will cover its own personnel's costs for domestic and international travel, food and accommodation and man-hours associated with twinning and other training activities under the programme when these activities are executed in South Africa, Denmark or a third country.

#### **17.4.2 Risks and risk mitigation**

There do not appear to be major risks involved in this component which cannot be overcome with proper planning. The DoE and Eskom have already established fruitful working relations under projects such as the Solar Park in Upington and the IRP 2010. This component will build on the success of previous collaboration.

#### **17.5 Fiduciary risks**

South African implementation agencies are subject to stringent reporting requirements in terms of the South African legislation and the Official Development Assistance (ODA) guidelines. These requirements not only meet the Danida reporting requirements, but exceed them. It has been found during previous programme preparations that the fiduciary risk in South Africa is assessed to below.

#### **Annexes:**



### Annex 1: Logical Framework for RE – South Africa

<b>Programme:</b>			
<i>Development objective</i>	<i>Indicators of overall objective achievement</i>	<i>Means of verification</i>	<i>Assumptions:</i>
Economic growth in the Republic of South Africa is decoupled from growth in overall GHG emissions	GHG emissions per GDP unit are reduced over time	National statistics on economic performance and total GHG emissions	
<i>Intermediate objective</i>	<i>Indicators of intermediate objective achievement</i>	<i>Means of verification</i>	<i>Assumptions (intermediate objectives ► overall objectives)</i>
Increased deployment of low carbon technologies in the energy sector	Increased percentage of total electricity generation from RE	42 % of new generation capacity are renewable energy technologies	Political will to implement carbon mitigation policy
<b>Component 1: Technical assistance to DoE</b>			
<i>Immediate objective of Component 1</i>	<i>Indicators of Immediate objective achievement</i>	<i>Means of verification</i>	<i>Assumptions (immediate objectives ► intermediate objectives)</i>
Facilitate the development of a less carbon intensive electricity sector by assisting the DoE develop more comprehensive energy planning capabilities that encompass the efficient deployment and integration of renewable energy and energy efficiency technologies.	Target for RE deployment in white paper on renewable energy Target for greenhouse gas mitigation in DoE compliance with NCCR white paper Policy document on energy efficiency in existing buildings	White paper on renewable energy published by DoE DoE implementation strategy complies with NCCR white paper Description of how NEES target for commercial and public buildings to be met	
<i>Outputs</i>	<i>Indicators of outputs</i>	<i>Means of verification</i>	<i>Assumptions (outputs ► immediate objectives)</i>
Reviewed White Paper on RE DoE implementation strategy for NCCR White Paper Policy document on energy efficiency in existing building stock	Draft white paper on RE approved by DoE Draft strategy for NCCR White Paper compliance approved by DoE Policy document on energy efficiency in existing building stock approved by DoE	DoE submission of white paper on RE to minister and Parliament, public consultation reports/comments and other government structures engagement reports DoE submission of draft Energy and Climate Change implementation strategy for NCCR white paper submitted to minister for approval – this would require concurrence with Dept of Environmental Affairs and the energy sector as a whole. DoE is currently leading the task teams on the Strategy. Policy document on energy efficiency in existing building stock submitted to minister	DoE submission of White Paper on RE to cabinet DoE submission of implementation strategy for NCCR white paper to Dept. of Environmental Affairs DoE submission of policy document on energy efficiency in existing building stock to cabinet
<i>Activities</i>	<i>Indicators of activities</i>	<i>Means of verification</i>	<i>Assumptions (activities ► outputs)</i>

<p><b>Component 1.1:</b> RE White paper                  Assistance to DoE staff in the revision the white paper on RE                  Assistance to DoE in development of alternative scenarios for RE deployment in South Africa                  Assistance to DoE in carrying out socio-economic analyses of RE policy alternatives in South Africa                  Assistance in coordinating and executing input to RE white paper and collecting data and information from stakeholders such as Eskom, SANEDI, etc.                  Support analysis of electricity governance and implementing structures to ensure organisational ability for implementation of RE</p> <p><b>Component 1.2:</b> Implementation of NCCR White paper: Formulation of the Energy and Climate Change Strategy                  Assistance to DoE in formulating implementation strategy for NCCR white paper                  Assistance to DoE on developing models for carbon mitigation to identify potential for reducing greenhouse gas emissions                  Assistance to DoE for developing socio-economic analyses of alternative mitigation initiatives                  Assistance to DoE in establishing coordinating body with stakeholders such as Eskom, Transnet, Spoornet, etc.</p> <p><b>Component 1.3:</b> Coordination of energy planning and regulation                  Assistance to DoE in establishing energy planning coordinating group                  Assistance to DoE in running and coordinating energy planning coordinating group                  Assistance to DoE in formulating improvements to regulatory framework for RE</p>	<p><b>Component 1.1:</b> RE White paper                  DoE staff formulate revision of RE White Paper                  DoE generates alternative scenarios for use in developing RE white paper                  Socio-economic analyses carried out by DoE                  Stakeholders provide input data to DoE for developing RE White Paper                  Analysis of power sector governance and implementing agents published</p> <p><b>Component 1.2:</b> Implementation of NCCR White paper: Formulation of the Energy and Climate Change Strategy                  DoE staff formulate implementation strategy for NCCR White Paper compliance                  Carbon mitigation models developed and implemented by DoE in line with the work already started on mitigation potential, carbon budgeting, etc.                  Socio-economic analysis of carbon abatement scenarios carried out by DoE                  Coordinating body for NCCR White Paper established</p> <p><b>Component 1.3:</b> Coordination of energy planning and regulation                  Energy Planning Coordinating Group established                  Energy planning coordinating group provides input to background reports for white papers                  Energy planning group in DoE identify important regulatory needs together with energy planning coordinating group</p>	<p><b>Component 1.1:</b> RE White paper                  RE White Paper sent for approval by minister                  RE white paper includes background reports clarifying decision making process</p> <p><b>Component 1.2:</b> Implementation of NCCR White paper                  Input for implementation strategy for NCCR White Paper sent to minister for approval                  implementation strategy for NCCR white paper compliance includes background reports clarifying decision making process</p> <p><b>Component 1.3:</b> Coordination of energy planning and regulation                  DoE leads Energy planning coordinating committee                  Energy planning coordinating group anchored in DoE and maintained to coordinate future energy planning and regulatory initiatives</p>	<p>Revision of RE White Paper remains priority of DoE</p> <p>Input to implementation strategy for NCCR White paper remains priority of DoE</p> <p>DEA continues work with NCCR White Paper with intent to ensure compliance</p> <p>SARi established and maintains current role for financing RE in South Africa</p> <p>Development of RE expertise through education and training remains priority</p> <p>NEES and Energy Act of South African maintain focus on energy efficiency and the use of smart meters</p>
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<p><b>Component 1.4:</b> Support for SARI Assistance in establishing financial model for SARI</p> <p>Assistance in handling foreign funds for deployment of RE</p> <p><b>Component 1.5:</b> Extension of support for RE training centre, SARETC</p> <p>Assistance in developing curriculum for wind energy engineering component at university level Assistance in developing curriculum for energy planning at university level</p> <p>Assistance in developing curriculum for wind energy technicians</p> <p><b>Component 1.6:</b> Energy efficiency Assistance in policy development on energy efficiency in existing buildings Assistance in development of regulatory framework for smart meters Assistance in implementation of smart meter technology in public buildings Assistance in analysis of energy demand initiatives in public buildings based on smart metering Capacity building of DoE staff on policy development for energy efficiency through twinning with Danish expertise</p> <p><b>Component 1.7:</b> National Energy Efficiency Awareness Campaign Strategy Assistance in design of Energy efficiency campaign Strategy</p>	<p><b>Component 1.4</b> Support for SARI Establishment of financial model</p> <p>Process for handling foreign funds developed</p> <p><b>Component 1.5:</b> Extension of support for RE training centre, SARETC</p> <p>Curriculum developed for wind energy engineering component at university level Curriculum developed for energy planning at university level</p> <p>Curriculum for wind energy component developed for technical training of wind energy technicians</p> <p><b>Component 1.6:</b> Energy efficiency DoE staff develop policy on energy efficiency in existing buildings DoE develop regulatory framework for smart meters Smart meter technology and energy efficiency monitoring equipment installed in identified public buildings DoE staff perform analysis of energy demand initiatives Twinning between DoE and Danish counterparts established</p> <p><b>Component 1.7:</b> National Energy Efficiency Awareness Campaign Strategy Energy efficiency campaign implemented</p>	<p><b>Component 1.4:</b> Support for SARI Financial model approved by DoE and National Treasury Process for handling foreign funds approved by DoE and National Treasury</p> <p><b>Component 1.5:</b> Extension of support for RE training centre, SARETC Curriculums submitted to DoE and Department of Education for approval</p> <p><b>Component 1.6</b> Energy efficiency Draft policy on energy efficiency in public buildings submitted for approval Draft regulation on smart meters submitted for approval Load management implemented in public buildings with smart metering Analysis of EE initiatives under component 6 published Energy efficiency campaign promoted by DoE</p> <p><b>Component 1.7:</b> National Energy Efficiency Awareness Campaign Strategy Energy efficiency campaign promoted by DoE</p>	
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Input	Indicators of input	Means of verification	Assumptions (inputs ► activities)
<p><b>Component 1.1:</b> Review of the RE White paper Capacity building and twinning in policy development Training and twinning in scenario development and scenario analyses Training and twinning in socio-economic analyses Capacity building in analysing and evaluating electricity governance structures</p> <p><b>Component 1.2:</b>Implementation of NCCR White paper: Formulation of the Energy and Climate Change Strategy Capacity building and twinning in carbon mitigation policy development Training and twinning in scenario development and scenario analyses Training and twinning in socio-economic analyses</p> <p><b>Component 1.3: Coordination of energy planning and regulation</b> Capacity building in role of DoE in policy development and leading policy development process Capacity building and twinning in assessing regulatory needs for RE deployment</p> <p><b>Component 1.4: SARI</b> Placement of international expert on RE financing in SARI Capacity building in SARI on financing RE projects</p> <p><b>Component 1.5: : Extension of support for RE training centre, SARETC</b> Twinning between Danish and South African education institutions on curriculum development Twinning between Danish and South African authorities on curriculum development in RE technology</p>	<p><b>Component 1.1: RE White paper</b> DoE staff have increased capacity for policy development DoE staff develop energy scenarios and carry out independent analyses of scenario results DoE staff carry out socio-economic analyses of policy alternatives DoE staff define role of each institution in energy governance structure in South Africa</p> <p><b>Component 1.2: Implementation of NCCR White paper:</b> Formulation of the Energy and Climate Change Strategy DoE staff have increased capacity for carbon mitigation policy development DoE staff develop carbon mitigation scenarios and carry out independent analyses of scenario results DoE staff carry out socio-economic analyses of carbon mitigation alternatives</p> <p><b>Component 1.3: Coordination of energy planning and regulation</b> DoE staff develop mission and strategic goals for energy planning coordinating group DoE identify areas where RE regulatory framework can be improved</p> <p><b>Component 1.4: SARI</b> International expert on RE financing appointed Financial model developed Increased capacity in SARI to evaluate financing of RE projects</p>	<p><b>Component 1.1: RE White paper</b> DoE staff participate actively in policy development DoE staff lead scenario development and analyses for RE white paper Recommendations on improving energy governance structure</p> <p><b>Component 1.2: NCCR White paper:</b> Formulation of the Energy and Climate Change Strategy DoE staff participate actively in carbon mitigation policy development DoE staff lead scenario development and analyses for NCCR white paper</p> <p><b>Component 1.3: Coordination of energy planning and regulation</b> DoE mission and strategic goals for energy planning coordinating committee submitted for approval Areas where regulatory improvement is needed submitted for further action</p> <p><b>Component 1.4: SARI</b> International expert on RE financing submits progress reports Financial model submitted for comments to DoE and National Treasury SARI submits evaluation criteria for RE projects to DoE and National Treasury for approval</p> <p><b>Component 1.5: Extension of support for RE training centre, SARETC</b> Curricula submitted for approval</p>	<p>DoE participate actively in training and twinning programmes Sufficient time allowed for DoE staff to utilise training in practise through twinning programme Sufficient support and understanding from DoE management for scenario development and socio-economic analyses DoE continues to support establishment of SARI Energy efficiency remains priority in Government policy Target for smart metering maintained</p>

<p><b>Component 1.6: Energy efficiency</b>                  Twinning and capacity building in energy efficiency policy development                  Twinning and capacity building in regulatory development for smart metering                  Implementation of energy efficiency initiatives in public buildings</p> <p><b>Component 1.7: National Energy Efficiency Awareness Campaign Strategy</b>                  Campaign on energy efficiency developed</p>	<p><b>Component 1.5: : Extension of support for RE training centre, SARETC</b>                  South African education institutions develop curricula for energy planning and wind energy engineering</p> <p><b>Component 1.6: Energy Efficiency</b>                  DoE develops policy document on energy efficiency in existing buildings                  DoE develops regulation for smart metering                  Energy efficiency targets achieved in participating public buildings                  Analysis of initiatives in public buildings carried out</p> <p><b>Component 1.7: National Energy Efficiency Awareness Campaign Strategy</b>                  Campaign developed</p>	<p><b>Component 1.6: Energy efficiency</b>                  Policy document on energy efficiency in public buildings submitted for approval                  Regulation in smart metering submitted for approval                  Energy consumption reduced in participating public buildings</p> <p><b>Component 1.7: National Energy Efficiency Awareness Campaign Strategy</b>                  Campaign taken up by target group</p>	
<p><b>Component 2: Further development of wind atlas in South Africa, WASA II</b></p>			
<p><b>Immediate objective of Component 2</b></p>	<p><b>Indicators of Immediate objective achievement</b></p>	<p><b>Means of verification</b></p>	<p><b>Assumptions (immediate objectives ► intermediate objectives)</b></p>
<p>The immediate objective of component 2 is to <i>further document the national potential for wind power and utilise resource data in strategic energy planning to improve framework conditions for the utilisation of South Africa’s wind resources for low carbon transition of the power sector.</i></p>	<p>Use of wind atlas in planning in DoE and Eskom</p>	<p>Data on potential resources incorporated in revision of white paper in DoE                  Data from wind atlas used in power system modelling in Eskom</p>	
<p><b>Outputs</b></p>	<p><b>Indicators of outputs</b></p>	<p><b>Means of verification</b></p>	<p><b>Assumptions (outputs ► immediate objectives)</b></p>

<p>A wind atlas covering remaining areas of Eastern Cape, KwaZulu-Natal and parts of Free State Provinces</p> <p>Continued metering from existing measurement masts established under WASA 1</p> <p>Mapping of potential as input to DoE for strategic energy planning purpose</p> <p>Collaboration with Eskom on data for day-ahead and in-hour forecasts for wind resources and generation; and</p> <p>Input into the Global Solar and Wind Atlas within the Clean Energy Ministerial as coordinated by the International Renewable Energy Agency (IRENA).</p>	<p>Extended wind atlas published</p> <p>Wind resources of RSA are mapped</p> <p>Data delivered to Eskom</p>	<p>Data from wind atlases publically available for input into power system models in accessible format i.e. Microsoft Excel</p>	<p>DoE and Eskom continue to include wind power in generation expansion policy</p>
<p><b>Activities</b></p>	<p><b>Indicators of activities</b></p>	<p><b>Means of verification</b></p>	<p><b>Assumptions (activities ► outputs)</b></p>
<p>Numerical wind atlas and database</p> <p>Wind Measurements</p> <p>Mesoscale Wind Modelling</p> <p>Micro-scale wind modelling and database</p> <p>Mapping of potential wind resources</p> <p>Data delivery to Eskom</p>	<p>KAMM/WRF/WASP statistical and dynamic downscaling established</p> <p>Establishment of meteorological stations for data collection</p> <p>Creation of observational wind atlas for selected measurement sites</p> <p>Collaboration established between SANEDI and Eskom</p>	<p>Microscale wind resource map for 80 % of South Africa</p> <p>Database of wind measurements from new meteorological stations</p> <p>Report on test of data for forecasting</p>	<p>Additional third party funding available to cover remaining part of original WASA II project</p>
<p><b>Input</b></p>	<p><b>Indicators of input</b></p>	<p><b>Means of verification</b></p>	<p><b>Assumptions (inputs ► activities)</b></p>
<p>Establishment of new wind masts</p> <p>Twinning on developing wind atlas and database with Danish counterparts</p> <p>Twinning on modelling of wind resources with Danish counterparts</p>	<p>Readings provided by new wind masts</p> <p>Continued cooperation between SANEDI and Danish counterparts on developing wind atlas for South Africa</p> <p>Continued cooperation between SANEDI and Danish counterparts on modelling wind resources</p> <p>Readings provided by new wind masts</p>	<p>Agreement between SANEDI and Danish counterparts on project definition and level of cooperation and twinning</p> <p>Readings provided by wind masts in new areas and physical confirmation of their positioning</p>	<p>Wind masts can be erected within timeframe of project</p> <p>Wind masts erected in new areas</p>
<p><b>Component 3: Technical assistance to Eskom for integration</b></p>			
<p><b>Immediate objective of Component 3</b></p>	<p><b>Indicators of immediate objective achievement</b></p>	<p><b>Means of verification</b></p>	<p><b>Assumptions (immediate objectives ► intermediate objectives)</b></p>

Maximise carbon mitigation through the efficient planning and technical integration of renewable energy technologies into the South African power system.	Maximum utilisation of RE generation output in the grid Inclusion of renewable energy in strategic planning on an equal footing with conventional generation	Maximum of 1 % curtailment of RE at national level Renewable energy displaces need for investments in conventional generation in baseline scenario in strategic energy planning	
<b>Outputs</b>	<b>Indicators of outputs</b>	<b>Means of verification</b>	<b>Assumptions (outputs ► immediate objective)</b>
Integration and simulation of renewable energy technologies in the Integrated Resource Plan Integration and simulation of transmission in Integrated Resource Plan Methodology for identifying strategic investments in transmission planning Development of system planning in Eskom Standards and guidelines for system operation with variable generation Identification of flexibility and reserves for integrating variable generation Development of fast track procedures for small projects in Grid Access Unit	Value of RE represented in Integrated Resource Plan Transmission included in Integrated Resource Plan Strategic transmission planning includes socio-economic analyses of transmission expansion Standards and guidelines for system operation with renewables adopted by Eskom Portfolio analysis identifying flexibility in existing power system for integrating variable generation carried out Analysis of reserves required for efficient integration of RE Fast track procedures for small projects accepted by Eskom and approved by DoE	Integrated Resource Plan determine costs and benefits of RE, need for reserves, identifies flexibility in system and influence of RE on future transmission investment requirements Strategic Transmission Plan includes socio-economic costs and benefits of at least two alternative major grid investment scenarios TDP includes scenario analysis of at least one major transmission investment Fast track procedures implemented in Grid Access Unit	Political will to implement RE targets in IRP 2010 Preferred bidders from Round 1 of REI4P connected to grid
<b>Activities</b>	<b>Indicators of activities</b>	<b>Means of verification</b>	<b>Assumptions (activities ► outputs)</b>

<p>Sub-component 3.1: Planning</p> <ul style="list-style-type: none"> <li>-Modelling of wind power in Eskom least cost dispatch power system modelling</li> <li>-Model development to include transmission system in Eskom least cost dispatch power system model</li> <li>-Capacity building in Eskom on scenario development and energy planning</li> <li>-Capacity building in Eskom on analysing socio-economic impacts of alternative power system scenarios</li> </ul>	<p>Sub-component 3.1: Planning</p> <p>Modelling of different designs and sizes of wind generators included in model</p> <p>Power curves and wind data in model provides realistic electricity delivery from wind power</p> <p>Development of locational signals in the long term energy model for use as early siting signals for generators</p> <p>Strategic planning philosophy and approach to identify least cost generation and transmission system development</p>	<p>Sub-component 3.1: Planning</p> <p>Wind power plays role in providing energy adequacy in long term energy planning</p> <p>New modelling codes for wind installed in Eskom models</p> <p>Unit commitment and transmission system included in Eskom models</p> <p>Power system scenarios send price signals to generators and consumers</p> <p>Difference in marginal cost of supply over bottlenecks used as indicator for congestion management in power system modelling</p> <p>Identification of infrastructure investments that will result in the optimisation of future operational costs</p> <p>Scenario planning for least cost system operation of the grid</p>	<p>Eskom continues to produce IRP for DoE</p> <p>Wind simulation included in IRP</p> <p>New methodologies for assessing transmission investments included in TDP</p> <p>Grid Access Unit participates actively in training programme</p> <p>Eskom management supports Grid Access Unit and development of fast track for small projects</p> <p>Policy guidelines from DoE on small projects</p>
<p>Sub-component 3.2: System studies and system operation</p> <ul style="list-style-type: none"> <li>-Dynamic and static state modelling of grid with renewable energy</li> <li>-Development of standards and guidelines for system operation for regional control centres</li> </ul>	<p>Sub-component 3.2: System studies and system operation</p> <p>Standard steady state and dynamic models for wind and solar PV integration studies</p> <p>Determination of quality of supply impacts of renewable energy integration</p> <p>Methodology for forecasting and aggregating distributed generation</p> <p>Operational studies and specialized impact studies for generation impact on losses, voltage control, power quality, harmonics and resonance</p> <p>Dynamic studies for local networks with multiple generators</p> <p>Techniques for distribution network voltage control, data requirements, thresholds etc.</p> <p>Outage and maintenance planning for networks incorporating IPPs developed</p> <p>Metering, remote interrogation and SCADA visibility requirements defined</p> <p>Criteria for real time network management</p>	<p>Sub-component 3.2: System studies and system operation</p> <p>System operation protocol for sub-transmission and distribution regional control centres</p> <p>Protection protocol for sub-transmission and distribution developed</p> <p>Aggregation of RE generators introduced for generation scheduling</p> <p>Forecasting of wind power carried out by system operator</p> <p>Dissemination programme for internal training requirements Documentation for small projects available on internet</p> <p>Strategy for Grid Access Unit approved by management</p>	
<p>Sub-component 3.3: Grid Access Unit &amp; small projects</p> <ul style="list-style-type: none"> <li>-Development of strategy for Grid Access Unit to implement fast track procedures for small project applications</li> <li>-Develop document with recommendations on fast track procedures for small projects</li> <li>-Develop documentation for small project applications</li> </ul>			



<b>Activities</b>	<b>Indicators of activities</b>	<b>Means of verification</b>	<b>Assumptions (activities ► outputs)</b>
	<p>Content of operating agreements with IPP's</p> <p>Operational auditing against grid and connection codes</p> <p>Sub-component 3.3: Grid Access Unit &amp; small projects</p> <p>Strategy for Grid Access Unit developed</p> <p>Fast track procedures sent for approval by management</p> <p>Documentation for small projects circulated and workshop with relevant parties held for input to documentation</p>	<p>Sub-component 3.3: Grid Access Unit &amp; small projects</p> <p>Fast track process for small projects implemented in Grid Access Unit</p> <p>Strategy adopted by Grid Access Unit</p>	
Input	Indicators of input	Means of verification	Assumptions (inputs ► activities)

<p>Sub-component 3.1: Planning</p> <p>Capacity building in scenario analyses, socio-economic analyses, system planning and strategic transmission planning</p> <p>Training programme and twinning on power system modelling and scenario development</p> <p>Twinning on transmission planning and system planning</p> <p>Sub-component 3.2: System studies and system operation</p> <p>Twinning on system studies and dynamic and static state modelling</p> <p>Twinning of task force for regional system operations on developing standards and guidelines for regional control centres</p> <p>Twinning of system operator on system operation, forecasting, dispatch rules, maintenance scheduling, information requirements and guidelines for dispatch and curtailment</p> <p>Twinning on dynamic studies and grid connection</p>	<p>Sub-component 3.1: Planning</p> <p>Study of the economic impact of wind power development plan for the power system</p> <p>Study on efficient use and development of power system infrastructure with increased levels of RE</p> <p>Socio-economic analysis of the costs and benefits of planned RE development for stakeholders in the power system</p> <p>System plan</p> <p>Analysis of long term scenarios for strategic transmission investment planning</p> <p>Integrated electricity plan for generation expansion</p> <p>Sub-component 3.2: System studies and system operation</p> <p>Study on impact of RE and forecasting errors on reserve requirements for power system</p> <p>Analysis of dynamic performance characteristics of power system portfolio</p> <p>Study on transient and frequency stability with RE generation</p> <p>Power quality studies and quality of supply management defined</p> <p>Standard procedures for grid connection and system studies associated with grid connection</p> <p>Development of recommendations for information exchange between generators and system operator</p>	<p>Sub-component 3.1: Planning</p> <p>Publication of system plan</p> <p>Publication of integrated electricity plan</p> <p>Publication of scenario analysis and socio-economic study of RE development</p> <p>Publication of strategic transmission plan</p> <p>Training programme attended by Eskom energy planners and modellers</p> <p>Twinning agreements signed and implemented</p> <p>Sub-component 3.2: System studies and system operation</p> <p>Report on dynamic performance of power system</p> <p>Report on reserve requirements and forecast error</p> <p>Dynamic studies carried out</p> <p>Simple standard procedure for grid connection developed</p> <p>Recommendations to Grid Code Committee on information exchange code and other appropriate sub-components of the grid code</p> <p>Twinning agreements signed and implemented</p>	<p>Eskom willing to actively participate in training programme</p> <p>Qualified staff made available for training</p> <p>Eskom provides necessary access to power system models and data</p> <p>Eskom willing to finance own travel costs</p>
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<p>Sub-component 3.3: Grid Access Unit &amp; small projects                  Capacity building and organisational strategy for one-stop shop                  Capacity building in developing strategy for Grid Access Unit and fast tracking small RE projects</p>	<p>Sub-component 3.3: Grid Access Unit &amp; small projects                  Draft recommendations for fast tracking of small RE projects                  Draft strategy for Grid Access Unit                  Recommendations on development, structure and functioning of one-stop-shop within Grid Access Unit</p>	<p>Sub-component 3.3: Grid Access Unit &amp; small projects                  Strategy for Grid Access Unit published                  Fast tracking of small RE projects sent to DoE for approval</p>	
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**Annex 2: Draft implementation Process Action Plan (PAP)**

<b>Related activity/output:</b>	<b>Schedule:</b>	<b>Responsible party:</b>
Programme Document in Final Form	December 2012	MCEB
Commitment letter/letter of intent signed	December 2012	DoE/MCEB
Initiation of recruitment of process consultant for Inception Phase and certain tendering and contracting activities	January 2013	DEA/MCEB
Government Agreement drafted and signed	March 2013	MCEB/Danish Embassy and DoE
Programme Start	April 2013	MCEB and DoE
Inception phase	April - September 2013	Process Consultant and DoE
Inception Review	September 2013	MCEB/DoE
Start of implementation	June 2013	DoE, SANEDI, ESKOM
Midterm Programme Review	Summer 2014	MCEB/DoE/Consultants
Programme activities completed	December 2015	DoE, SANEDI, ESKOM
Submission of Programme Completion Report	January 2016	DoE

### Annex 3: Reference documents

1. Status Quo of the South African Wind Energy Sector, Johan van den Berg, SAWEA, May 2012-06-12
2. Grid and Wind Power in South Africa, RENAC/SAWEA, 2012
3. Wind Atlas for South Africa, Phase 1 and 2, Presentation by SANEDI, 2012
4. EIB press release on South African Renewable Initiative, 2009
5. Integrated Resource Plan for Electricity, 2010-2030, Revision 2, Final Report, 2009
6. The Legal Framework for Renewable Energy in South Africa, Jan Glazewski, University of Cape Town
7. Global Renewable Energy Markets and Policies Programme, Country profile: South Africa, June 2007
8. National Climate Change Response (NCCR) for South Africa
9. White Paper on Renewable Energy, Ministry of Minerals and Energy, November 2003
10. Denmark-South Africa, Partnership for the Future, Royal Danish Embassy, June 2010
11. Prospects for Renewable Energy in South Africa, Discussion Paper, German Development Institute. 2009
12. Energy policies for sustainable development in South Africa, Energy Research Centre, University of Cape Town, April 2006
13. Press release on South African National Energy Development Institute, Department of Energy, 17 May 2012
14. South African Wind Energy Programme, A Otto, 2<sup>nd</sup> Annual Wind Energy Seminar, September 2010,
15. CO<sub>2</sub> emissions from fuel combustion – highlights, 2011 edition

**Annex 4: Budget****Indicative Budget:**

Activity 2013-2015	DKK
Component 1.1 DoE - White paper on Renewable Energy	4.000.000
Component 1.2 DoE - Implementation of NCCR White paper	1.500.000
Component 1.3 DoE - Coordination of energy planning and regulation	750.000
Component 1.4 DoE - Financial model for SARi	2.750.000
Component 1.5 DoE - Renewable Energy training centre, SARETC	2.250.000
Component 1.6 DoE - Policy and Regulation on Energy Efficiency	4.000.000
Component 1.7 DoE - National Energy Efficiency Awareness Campaign Strategy	500.000
Energy Consultant (Tender in Denmark) <sup>9</sup>	3.000.000
Sub Total DoE	18.750.000
Component 2.1 SANEDI - Hardware, masts, installation, instruments, O&M	3.000.000
Component 2.2 SANEDI - Technical assistance	7.500.000
Component 2.3 SANEDI - Running costs	1.500.000
Sub Total SANEDI	12.000.000
Component 3.1 ESKOM - Planning	4.250.000
Component 3.2 ESKOM - System studies and system operation	1.500.000
Component 3.3 ESKOM - Grid Access Unit and small Independent Power Producers	1.000.000
Sub Total ESKOM	6.750.000
Program Coordinator <sup>10</sup>	1.375.000
Programme management - including reviews and revision (fixed administrative fee 5%) of the TA portfolio (Excluding Component 2) to SANEDI <sup>11</sup>	1.125.000
Sub Total Project Coordination and Administration	2.500.000
<b>Total</b>	<b>40.000.000</b>

Note: The allocation of funds to each component will be determined in the inception phase and during the course of the programme in accordance with the needs of the DoE and Eskom.

<sup>9</sup> Exact amount to be determined

<sup>10</sup> Exact amount to be determined

<sup>11</sup> Exact amount to be determined

Detailed budget for component 2 as provide by SANEDI:

<b>Component 2: Wind atlas</b>	<b>Days</b>	<b>Daily rate (DKK)</b>	<b>Totally (DKK)</b>
Hardware, masts, installation, instruments, O&M	-		<b>3,014,184</b>
Technical assistance:			<b>7,465,474</b>
DTU Wind Energy	353	5,592	1,974,000
CSIR - Council for Scientific and Industrial Research	989	3,971	3,926,950
UCT- University of Cape Town	309	3,408	1,053,191
SAWS - South Africa Weather Service	17	5,373	91,333
SANEDI - South African National Energy Development Institute	780	538.5	420,000
Running costs	-		<b>1,520,340</b>
<b>Total</b>			<b>12.000.000</b>

Note: The final budget for Component 2 needs to reflect at least 5% contingency (to be able to cope with thefts and replacements etc.) All VAT assumed included.

## **Annex 5: Draft ToR for a Programme Coordinator – South Africa**

### **Background**

Denmark has a strategic priority to strengthen cooperation with the Republic of South Africa (RSA) in the area of renewable energy and energy efficiency as expressed in the Memorandum of Understanding (MoU) between the two Governments signed October 2011. The Ministry of Climate, Energy and Building (MCEB) has initiated a dialogue with the Government of South Africa on the framework for Danish financing and technical assistance to a low carbon transition within the energy sector, specifically targeting renewable energy initiatives. The funding for the assistance to RSA will be sourced from the Global Framework under the Danish Climate Change Funds.

A Danish support programme has been developed with a view to assist RSA in implementing its policy on developing a low-carbon economy with special focus on electricity supply.

The programme will be managed jointly by the South African Department of Energy (DoE) and MCEB, who each will appoint a representative for a Management Committee.

To facilitate the programme, a Programme Coordinator will be employed by and work from the Danish Embassy in Pretoria. The Programme Coordinator will be working as a staff member at the Danish Embassy in Pretoria under the overall supervision of the management of the Embassy while receiving instructions and guidance on programme specific issues from MCEB, report to MCEB on the management of the programme, including flagging issues that require urgent strategic direction.

The Programme Coordinator will further deal with financial and administrative issues with the relevant entities in the Danish Ministry of Foreign Affairs, and be responsible for the daily programme related dialogue with the South African partners.

The main duties of the Programme Coordinator involve assistance in monitoring the progress of the Danish programme, and enhance donor coordination as well as to provide advice and support on overall programme management.

The Management Committee consists of DoE and MCEB, but MCEB can delegate the responsibility if deemed relevant. Thus it is foreseen that the Programme Coordinator together with the Energy Consultant could represent MCEB in the Management Committee, if MCEB is not directly represented. Furthermore the Program Coordinator will function as secretary for an Advisory Board.

It should be emphasised that South African National Energy Development Institute (SANEDI) is responsible for the daily operations of a facility for Technical Assistance



(TA) – with supervision from the Programme Coordinator enabling the Management Committee to take decisions.

## **Responsibilities**

The main responsibilities of the Programme Coordinator are to:

- Support programme implementation in close cooperation with SANEDI and DoE – and in close corporation with the energy consultant.
- Supervise the financial management of the programme in close cooperation with SANEDI.
- Represent MCEB and EDK in the Management Committee meetings and other meetings related to programme implementation.
- Report to MCEB on the progress of the programme, including flagging issues that require urgent strategic direction and/or decision-making of a technical nature.
- Coordination of activities of international long and short-term advisors with a view to optimising the use of resources. The Programme coordinator will provide assistance to and oversight of SANEDI's work on development of ToR, tendering and contract management, support analysis of job descriptions, and provide support to clarification of recruiting procedures in consultation with MCEB.
- Assist the programme component managers in establishing consultancy and/or twinning arrangements with relevant sector entities in Denmark.
- Provide technical assistance to establishment of coherent indicators and performance monitoring systems and assisting in integrating these indicators into the general reporting and budgeting system as well as coordination and quality assurance of programme activities in close dialogue with EDK, MCEB and DoE.
- Assist in the preparation of the consolidated programme inception report and assist and coordinate preparation of and input from component inception reports.
- Assist the Programme Advisory Board in relevant management issues including preparation of regular meetings, setting up of agendas and preparing annotated agendas.
- Liaise with the relevant teams in the Embassy to obtain possible economic, commercial and political synergies of the programme.

The Programme Coordinator shall liaise closely with the Energy Consultant throughout the programme implementation period. The responsibilities of the Programme Coordinator may be subject to revision after the inception period.

### **Qualifications:**

- Higher education (minimum master level) in energy management, engineering, economics or social science.
- Preferable work experience in one or more related fields such as: energy efficiency, renewable energy, cleaner production.
- Proven leadership, management and coordination skills, and preferably experience with financial management.
- Ability to work as part of an interdisciplinary team with relations to different ministries and stakeholders with complex problems in diverse institutions and cultural settings.
- Excellent interpersonal skills and understanding of the advisory role in developing countries. Experience from working in Africa particularly in the South African setting as well as in the Danish Central administration will be an advantage.
- Energetic and persistent work effort - ability to start-up processes and to ensure that things are in fact happening and results are obtained.
- A good understanding of the importance of governance and social issues and their linkages to poverty reduction.
- Good written and verbal communication skills.
- A high level of proficiency in English and Danish (written and spoken) – at negotiation level.

### **Timing**

The Programme Coordinator will be posted from April 2013 or as soon as possible thereafter.

### **Work location**

The Embassy of Denmark (EDK) in Pretoria while working together with employees at DoE, ESKOM, SANEDI and MCEB.

### **Employment conditions**

The Programme Coordinator will be employed until end 2015 as in accordance to the Staff rules of the embassy of Denmark.

## **Annex 6: Draft ToR for an Energy Consultant - South Africa**

### **Background**

Denmark has a strategic priority to strengthen cooperation with the Republic of South Africa (RSA) in the area of renewable energy and energy efficiency as expressed in the Memorandum of Understanding (MoU) between the two Governments signed October 2011. The Ministry of Climate, Energy and Building (MCEB) has initiated a dialogue with the Government of South Africa on the framework for Danish financing and technical assistance to a low carbon transition within the energy sector, specifically targeting renewable energy initiatives. The funding for the assistance to RSA will be sourced from the Global Framework under the Danish Climate Change Funds.

A Danish support programme has been developed with a view to assist RSA in implementing its policy on developing a low-carbon economy with special focus on electricity supply.

To facilitate the programme an Energy Consultant will be posted in Pretoria to spearhead the provision of policy advisory services on renewable energy and energy efficiency through close cooperation with the DoE and MCEB.

The programme will be managed jointly by the South African Department of Energy (DoE) and MCEB, who each will appoint a representative for a Management Committee. The Management Committee consists of DoE and MCEB, but MCEB can delegate the responsibility if deemed relevant. Thus it is foreseen that the Energy Consultant could represent MCEB in the Management Committee, if MCEB is not directly represented.

The Energy Consultant will in particular provide advice and support on overall programme and as a key task be involved in capacity building and the implementation of activities within DoE and the National Electricity Company, ESKOM in relation RSA climate strategy and energy planning issues. A focus will be on integration of renewable energy in the South African electricity grid.

### **Responsibilities**

The main responsibilities of the Energy Consultant are to:

- Spearhead the provision of policy advisory services on renewable energy (RE) and energy efficiency (EE) through close cooperation with the South African Department of Energy (DoE) and the MCEB.

- Assist in developing RE policy and strategy in RSA, and assist DoE in scenario development and economic analysis.
- Provide advice and support on overall programme in particular the development of the review of the RE White Paper, NCCRWP strategy and support for the National Electricity Company, ESKOM.
- Support Programme implementation and provide other relevant capacity development such as development of training activities.
- Management support to key staff within the DoE.

The responsibilities of the Energy Consultant may be subject to revision after the inception period.

### **Qualifications:**

- Higher education (minimum master level) in energy management, engineering, economics or social science.
- Preferably minimum 10 years of relevant professional experience from the energy sector.
- Relevant technical qualifications and professional experience in energy sector management and planning. Competences on system integration of renewable energy will be an advantage.
- Proven leadership and coordination skills.
- Ability to work as part of an interdisciplinary team with relations to different ministries and stakeholders with complex problems in diverse institutions and cultural settings.
- Excellent interpersonal skills and understanding of the advisory role in developing countries.
- Energetic and persistent work effort - ability to start-up processes and to ensure that things are in fact happening and results are obtained.
- A good understanding of the importance of governance and social issues and their linkages to poverty reduction.
- Good written and verbal communication skills.
- A high level of proficiency in English and preferable Danish (written and spoken) – at negotiation level.

### **Timing**

The Energy Consultant will be posted from April 2013 or as soon as possible thereafter.

**Work location**

To be determined

**Employment conditions**

To be determined

The Energy Consultant will be employed until end 2015