

CLIMATE INVESTMENT FUNDS

CTF/TFC.12/6/Rev.1
October 27, 2013

Meeting of the CTF Trust Fund Committee
Washington D.C.
October 28, 2013

Agenda Item 7

UPDATE OF CTF INVESTMENT PLAN FOR SOUTH AFRICA

PROPOSED DECISION

Recalling its endorsement in October 2009 of the *CTF Investment Plan for South Africa*, and further recalling its approval of CTF funding for the following project/programs in South Africa:

- a) Eskom Renewables Support Project, USD 350 million, AfDB and IBRD (CTF funding approved in November 2010/May 2011);
- b) Energy Efficiency Program, USD 15 million, AfDB and IFC (CTF funding approved in September 2010); and
- c) Sustainable Energy Acceleration Program, USD 85 million, AfDB and IFC (CTF funding approved in October 2010);

the Trust Fund Committee reviewed document CTF/TFC.12/6/Rev.1, *Update of CTF Investment Plan for South Africa* (October 2013), submitted by the Government of South Africa in collaboration with the African Development Bank and the World Bank Group, and takes note of the updates on the implementation of the projects and programs financed by the CTF. The Committee endorses the following revisions to the *CTF Investment Plan for South Africa* (also see summary table below):

- a) Cancelling USD 7.5 million in CTF funding (with AfDB) from the Energy Efficiency Sub-Component (already approved by the Trust Fund Committee under the Sustainable Energy Acceleration Program);
- b) Dropping the Solar Water Heater Sub-Component with USD 50 million in CTF funding (USD 25 million with AfDB and USD 25 million with IFC; not yet approved by the Trust Fund Committee); and
- c) Reallocating USD 57.5 million in CTF funding as a result of a) and b) to finance either a private sector sustainable energy program or a public sector vehicle efficiency program (with AfDB).

The Trust Fund Committee endorses the revisions as a basis for the further development of the proposed activities for CTF funding, notes that the total indicative allocation after the revisions remains at USD 500 million in CTF funding, and recalls that the approval of CTF funding by the Committee is dependent upon the submission of high quality project or program proposals. The Committee requests AfDB to work closely with South Africa to expedite the development of a new program using the remaining indicative CTF allocation for submission to the Trust Fund Committee for funding approval by June 2014.

Summary of Revisions to the CTF Investment Plan for South Africa

	AfDB (public sector)	AfDB (private sector)	IBRD	IFC	Subtotal
1. Wind (no change)	50		50		100
2. CSP (no change)	50		200		250
3. Private Sector		75 -32.5		75 -25	150 -57.5
4. Sustainable Energy Program (public) or Vehicle Efficiency Program (private)	[+57.5]	[+57.5]			+57.5
Subtotal	100 [+57.5]	75 (-32.5) [+57.5]	250 (no change)	75 (-25)	500 (no change)
Revised total allocations	200		250	50	500

CLEAN TECHNOLOGY FUND

**UPDATED INVESTMENT PLAN FOR SOUTH AFRICA
(PHASE 1 B)**

**OCTOBER 2013
SOUTH AFRICA**

Contents

Executive summary.....	6
Introduction	10
Report on Phase 1: Summary.....	11
Status of original investment plan implementation	12
Component 1: Sere Wind Power Plant (WPP).....	13
Component 2: Upington Concentrated Solar Power Plant (CSP)	18
Component 3: Private Sector	24
Sub-component 1: SUSTAINABLE ENERGY COMPONENT	25
Sub-component 2: ENERGY EFFICIENCY (EE) COMPONENT.....	28
Sub-component 3: SOLAR WATER HEATER (SWH) ROLL- OUT.....	29
Context and rationale for the investment plan update - new legislation/ policies and trends..	30
Phase 1 Update: Proposed revision to the Investment Plan	33
ANNEXURES	41
Annex 1 Bibliography	41

List of Tables

Table 1: Summary of commitments for the SA-IP Phase 1 (USD million).....	7
Table 2: Summary of commitments for the SA-IP Phase 1 (USD million).....	12
Table 3: Procurement and contract awarded- Sere Wind farm (USD million).....	14
Table 4: Co-financing target levels and achievements for South Africa’s CTF Investment plan Phase 1- Sere Wind farm (USD million).....	15
Table 5: Co-financing of Sere Wind farm as of August 2013 (USD million)	16
Table 6: Indicative disbursement forecast of Sere Wind farm (USD million)	16
Table 7: Summary procurement status under component 1 (CSP)	18
Table 8: Co-financing target levels and achievements for South Africa’s CTF IP Phase 1- CSP	20
Table 9: Co-financing of CSP component as of August 2013.....	20
Table 10: Financing plan per project items and lenders (USD million, est. Sept. 2013)	22
Table 11: FTE employment created during construction – high road scenario.....	23
Table 12: Impact on employment during operations.....	23
Table 13: Revised allocation of resources per lender/per area/types of intervention (USD million).....	25
Table 14: Commitments for Sub-component 3: SEAT (USD million, Sept. 2013) ..	26
Table 15: Overall progress for CSP !KaXu site (to end 08/ 2013)	27
Table 16: Commitments for Sub-component 3: EE (USD million).....	29
Table 179: Tentative Financing Plan (USD million) Phase 1B	40

List of Abbreviations and Acronyms

AFD	Agence Française de Développement
AfDB	African Development Bank
AIDC	Automotive Industry Development Centre
BRT	Bus Rapid Transit
BRT	Bus Rapid Transit
CoJ	City of Johannesburg
COP	Conference of the Parties
CNG	Compressed Natural Gas
CSP	Concentrated Solar Power
CTF	Clean Technology Fund
DBSA	Development Bank of Southern Africa
DFI	Development Finance Institutions
DME	Department of Minerals and Energy
DoE	Department of Energy
DoT	Department of Transport
DSM	Demand Side Management
EA	Environmental Assessment
ECA	Environmental Conservation Act
EE	Energy Efficiency
EEDSM	Energy Efficiency and Demand Side Management
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EISP	Eskom Investment Support Project
EMP	Environmental Management Plan
EPC	Engineer, Procure, Construct
ERC	Energy Research Centre
ESCO	Energy Service Companies
FI	Financial Institutions/Intermediaries
GHG	Greenhouse Gas
IBRD	International Bank for Reconstruction and Development (World Bank or WB)
IDC	Industrial Development Corporation
IDP	Integrated Development Plan
IEP	Integrated Energy Plan
IFC	International Finance Corporation
IP	Investment Plan
IPAP	Industrial Policy Action Plan
IPP	Independent Power Producer
IRP	Integrated Resource Plan (for electricity)
ISEP	Integrated Strategic Electricity Plan
ISMO	Independent system and market operator
ITP	Integrated Transport Plan
KfW	Kreditanstalt für Wiederaufbau
KPI	Key Performance Indicator
LTMS	Long Term Mitigation Scenario/Strategy

MTPPP	Medium Term Power Purchase Programme
NATMAP	National Transport Master Plan
NDP	National Development Plan Vision 2030
NEEA	National Energy Efficiency Agency
NEMA	National Environmental Management Act
NERSA	National Energy Regulator of South Africa
NGP	The New Growth Path framework
NIP	National Infrastructure Plan
NLTSF	National Land Transport Strategic Framework
NLTTA	National Land Transport Transition Act
NMT	Non- Motorised Transport
NPC	National Planning Commission
NT	National Treasury
OCGT	Open-Cycle Gas Turbine
OE	Owner's Engineers
PFMA	Public Finance Management Act
PICC	Presidential Infrastructure Coordinating Committee
PPA	Power Purchase Agreement
PPPFA	Preferential Procurement Policy Framework Act
PTISG	Public Transport and Infrastructure and Systems Grant
PV	Photovoltaic
RE	Renewable Energy
REFIT	Renewable Feed-in Tariff
REIPPPP	Renewable Energy Independent Power Producers Procurement Programme
RFP	Request for Proposals
RTS	Return-to-Service Programme
SANERI	SA National Energy Research Institute
SANEDI	South African National Energy Development Institute
SAWEA	South African Wind Energy Association
SE	Sustainable Energy
SIPs	Strategic Integrated Projects
SME	Small and Medium Enterprise
SO	System Operator
SWH	Solar Water Heater
UCT	University of Cape Town
UJ	University of Johannesburg
UNFCCC	United Nations Framework Convention on Climate Change
VEP	Vehicle Efficiency Programme
WPP	Wind Power Plant
WT	Wind Turbine
US EIA	United States Energy Information Administration
USD	US Dollar
ZAR	South African Rand

Executive summary

1. Phase 1 of the Clean Technology Fund (CTF) Investment Plan for South Africa is back on track to meet its overall objectives after initial delays. Two of the three major components (solar and wind plants) have revised their timeframes, with the wind plant having finalised contracts with suppliers and the solar plant in the process of resolving the delays in procurement. Implementation of these components will contribute significantly towards meeting the Investment Plan's objectives of generating renewable energy and reducing CO₂ emissions. The third component (Support to the Private Sector) comprising three different types of initiatives – Energy Efficiency, Sustainable Energy Generation and Solar Water Heater roll-out, has been restructured to take into consideration the readiness level of the private sector and policy and strategy changes in the sector.

2. The first two components focus on public sector support. They are being implemented by the state-owned enterprise, Eskom Holdings Ltd (“Eskom”). The projects in this component aim to facilitate the accelerated development of large-scale renewable energy production capacity. They are:

Component 1: Co-financing for the development, construction and operation of the grid-connected utility-scale 100MW capacity Wind Power Plant in Sere (Western Cape). Contracting is complete; site offices established and works are underway. The first facility is expected to be operational by May 2014.

Component 2: Co-financing for the development, construction and operation of the grid-connected 100MW capacity Concentrated Solar Thermal Power (CSP) facility in Upington (Northern Cape). Delays in resolving the complexities in technical design and solutioning process resulted in the expiry of particular procurement waivers. The TORs are now finalised and Eskom is currently in discussions with government to grant an extension to the required procurement waiver.

3. The third component comprises initiatives aimed at supporting the private sector, through direct support for sustainable energy (SE) projects (both within and outside the aegis of the Renewable Energy Independent Power Producer Procurement Programme) collaboration with Financial Intermediaries (FIs) and Energy Service Companies (ESCOs) to enhance energy efficiency, and engagement in Solar Water Heating (SWH). Thirty percent (USD 45 million) of the total CTF resources for this component are committed across 4 projects.

4. Components 1 (WPP) and 2 (CSP); as well as USD 45 million from the CTF-IFC are fully committed. The remaining USD 105 million includes USD 50 million earmarked for the SWH programme, and USD 55 million committed for the SE and Energy Efficiency (EE) programmes. However out of the remaining USD 105 million AfDB is planning to commit in the next few months USD 42.5 million from its private sector allocation to support a utility scale CSP project and IFC intends to commit USD 5 million for an EE programme (the residual CTF resources will then be of USD 57.5 million).

5. The table below provides a summary of the resources committed at MDB level and residual amounts.

Table 1: Summary of commitments for the SA-IP Phase 1 (USD million)

	WPP	CSP	PS	CTF IP 1	Balance
Total investment costs ¹	445	783	-	-	-
<i>Total investment costs (revised planned for CSP)</i>	<i>375²</i>	<i>1197³</i>	-	-	-
<i>Total investment costs (actual for WPP)</i>	<i>217⁴</i>				
CTF investment (planned)	100	250	150	500	-
<i>CTF investment (actual)</i>	<i>100</i>	<i>250</i>	<i>45</i>	<i>395</i>	<i>-105⁵ (-21%)</i>
Co-financing/ Counterpart funding (planned)	345	350	1,200	1,895	-
<i>Co-financing/ Counterpart funding (actual)</i>	<i>275⁶</i>	<i>947⁷</i>	<i>1,050</i>	<i>2,204</i>	<i>+309 (+17%)</i>

6. South Africa is conscious that it is one of the largest emitters of CO₂. The energy sector is the single largest source of CO₂ emissions, with coal accounting for more than 90 percent of total emissions by fuel source. The transport sector represents

¹ The planned Total Investment Costs are based on the joint AfDB and IBRD submission (November 2010) to the CTF.

² The USD 445 million was revised in the AfDB PAR to USD 375 million, (May 2011) based on market estimates for the plant of USD 345 million and includes a figure of USD 30 million required to support connections of future wind power plants to the grid.

³ As per Fitchner report (2011).

⁴ The figure of USD 217 million represents the cost of awarded contracts, and excludes interest during construction. Refer to Table 4 for details.

⁵ Though not actually committed yet, an amount of USD 5 million - part of the IFC- CTF resources- from the USD 105 million will be utilized under the aegis of the Energy Efficiency programme in Component 3 (private sector). The IFC-CTF project has received concept approval within IFC and is moving towards appraisal (October 2013). In addition, USD 42.5 million - the AfDB-CTF resources are expected to be utilized under the aegis of the Sustainable Energy Acceleration programme in Component 3 (private sector) . Hence, the CTF financing available for re-allocation or re-prioritization is USD 57.5 million.

⁶ As approved by the financiers: AfDB, AFD and WB and includes the Eskom counterpart funding.

⁷ All co-financing approved except EIB which is scheduled for end 2013

about 13-15 percent of South Africa's greenhouse gas (GHG) emissions, and emissions from the sector grew by about 17 percent between 2007 and 2011. If South Africa continues with a business-as-usual growth path, its emissions will almost quadruple by 2050.

7. Major policy changes introduced since the approval of the original Investment Plan reinforce South Africa's commitment to address climate change. The National Planning Commission's (NPC) research indicates that new power generation between 2025 and 2030 should be dominated by natural gas with solar thermal, wind and imported electricity meeting the remaining requirements, even in modelling scenarios with higher growth in demand. The National Development Plan (NDP) recommends a transition in the energy mix towards a low carbon economy with the contribution of gas and renewable energy resources (wind, solar and imported hydroelectricity) to increase substantially. To support these objectives the (Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) is designed to contribute 3,725 megawatts towards the government's renewable energy target. The introduction of such programmes will diversify the country's energy markets - creating greater opportunities for investors to provide innovative, sustainable solutions within credible and predictable regulatory frameworks.

8. The NDP also promotes greater investment in public transport infrastructure that reduces carbon emission levels, and encourages the use of hybrid and other low emission vehicles. The impending approval of the National Transport Master Plan (NATMAP) by cabinet which includes more energy efficient vehicles, supported by a dedicated transport infrastructure grant, will foster the implementation of several initiatives that reduce emissions in the sector.

9. This updated CTF Investment Plan proposes reprioritisation of the residual CTF resources - USD 57.5 million - to either support private sector generation of renewable energy or projects in public transport based on an assessment of readiness.

10. **Sustainable Energy Programme:** the most significant development in place for sustainable energy is the successful implementation of the first two rounds of the REIPPPP. It is, therefore, proposed that the unallocated USD 57.5 million of CTF resources to further support the capital-intensive utility-scale projects, especially Concentrated Solar Power, and potentially small-scale RE envisaged as part of the REIPPPP programme.

11. **Vehicle Efficiency Programme (VEP,** fuel switching - Total cost USD 375 million; CTF USD 57.5 million; AfDB USD 257 million; Government USD 60.5 million). The project involves the conversion of conventional diesel/petrol engines of existing vehicle fleet to dual fuel system (liquid fuel/CNG) including implementation of related infrastructure. The vehicle fleet considered for the programme are the public transport fleet, i.e. buses and minibuses/taxis, government buses/minibuses and heavy freight trucks with expected CO₂ emissions reduction of 50-60% per unit depending on vehicle category or type. A sequel to Phase 1B (i.e. Phase 2) is anticipated, expanding the project footprint across the national public transport network, based on the replicability and scalability attributes of VEP. The overall programme aimed at transforming the transport sector from 'business as usual' practices towards making climate change and low-carbon economy central to its

investment is referred to as the Technological Transformation Programme on Sustainable Transport for South Africa (TTP-STSA).

12. Any relevant projects that might not be supported in Phase 1B will be considered as part of a potential Phase 2 IP proposal, including the national Roll Out of the Vehicle Efficiency Programme and BRT public transport systems to other cities and towns (USD 400 million of CTF resources).

13. Cumulative emissions savings from the pilot VEP programme projected over a twenty-year period are 1.24 million tons in phase 1B. It is more difficult to estimate the emissions savings from the SE programme, given the nature of the investments and project outputs.

14. Since most of the components of the SE programme can be sourced locally, the economic and social benefits of these renewable technologies would include domestic industrial development and employment. All the interventions will have public health and environmental co-benefits such as reduced NO_x, SO_x and particulates.

Introduction

17. This document presents the Clean Technology Fund Investment Plan Update for South Africa. The Investment Plan (IP) approved by the CTF Trust Fund Committee on 28 October 2009⁸(hereafter referred to as Investment Plan Phase 1) proposed CTF financing for a global amount of USD 500 million to support South Africa's goals of generating four percent (4%) of the country's electricity requirements from renewable energy by 2013 and improving energy efficiency by twelve percent (12%) by 2015. Specifically, the Investment Plan Phase 1 proposed CTF co-financing for a 100MW grid-connected solar thermal power in Upington in the Northern Cape, a 100MW utility-scale wind power plant in Sere in the Western Cape, initiatives towards improved energy efficiency and support to green industries, particularly in the commercial and industrial sectors, notably through a large programme of support to the deployment of solar water heaters (SWH). It was foreseen that the CTF investments would mobilize additional financing of about USD 3.4 billion from bilateral and multilateral financiers, and private sector financing. This update of the Investment Plan is expected to complement existing initiatives with investment in GHG emission reduction initiatives in the field of transport as accelerated urbanization and insufficient and inefficient public transport options are increasingly contributing to local pollution and rising GHG emissions.

18. The Clean Technology Fund (CTF) Phase 1 for South Africa has experienced delays since inception, with two of the three components (solar and wind plants) now being back on track to meet their overall objectives. These two components are important infrastructure investments, with the realisation of their goals in terms of power generation and CO2 savings only fully measurable once the plants are actually commissioned. The third component (Support to the Private Sector) is composed of three different types of initiatives – Sustainable Energy, Energy Efficiency and Solar Water Heater roll-out - and has been implemented to take into consideration the readiness level of the private sector and policy and strategy changes in the sector.

19. A total of USD 2.3 billion has been leveraged from the current CTF financing which represents an increase in expected leverage by 17% compared to what was initially foreseen at appraisal. These projects, when fully realized, will contribute greatly to the South African government's goals of enhancing energy security, supporting a clean energy transition and increasing private sector development in the renewable energy sector. They are, in the meantime, providing valuable lessons on managing multi-lender capital investment programmes in these sectors, determining interest of the various types of stakeholders and their preparedness to engage in effective renewable energy generation and/ or energy efficiency initiatives. The success of the project's impact on facilitating the replication and scaling up of similar projects both locally and in the region should be assessed.

⁸ Revised in November 2009

20. The diversification of South Africa's energy mix is a medium-to-long-term initiative, with the extensive deployment of renewable energy resources forming the basis for long-term cuts in GHG emissions⁹. Diversification entails a long-term effort to harness a variety of new and existing technologies. In parallel, in order to moderate demand growth, Eskom, together with the Department of Energy (DoE) and the National Energy Regulator of South Africa (NERSA), has embarked on a Demand Side Management (DSM) programme aimed to save 3,000 megawatts (MW) of generation capacity by 2013 at a cost of approximately R10 billion (USD 1.25 billion). The EE/DSM programmes represent the Government's first steps towards implementing its long-term mitigation scenarios (LTMS) designed to deal with climate change issues. At the time of the drafting the IP, total GHG emissions were 435 MtCO_{2e} in South Africa with the energy sector contributing 70% of these emissions. The national GHG emissions reduction target (for 2020) is 34% with the expected CTF funding to contribute 65.6 MtCO_{2e} of the GHG emission savings.

Report on Phase 1: Summary

21. Phase 1 is composed of two major workstreams: The first one, a public sector stream, aims to facilitate the accelerated development of large scale renewable energy production capacity in support of the long term carbon mitigation strategy of South Africa. This stream comprises two components that foster the low carbon objectives and priorities as outlined in South Africa's Long Term Mitigation Scenarios (LTMS) of 2008, its National Climate Change Response Strategy (2004), its White Paper on Renewable Energy (2005) and its National Energy Efficiency Strategy (2009). The two components of Phase I are as follows:

Component 1: Co-financing for the development, construction and operation of the grid-connected utility-scale 100MW capacity Wind Power Plant (WPP) in Sere, (Western Cape);

Component 2: Co-financing for the development, construction and operation of the grid-connected 100MW capacity concentrated solar thermal power plant (CSP) in Upington, (Northern Cape).

Both these components will lay the foundation for a future fleet of power plants by demonstrating positive impacts of renewable energy generation technologies and will provide important lessons towards replication. The state-owned enterprise, Eskom Holdings Ltd ("Eskom") is implementing these two initiatives as the executing agency, assisted by the two Owner's Engineers procured under the two projects. Eskom is both the borrower and the beneficiary of the loans.

22. The second workstream (component 3: Private Sector) comprises initiatives aimed at supporting the private sector, through support for renewable energy projects (both

⁹ South Africa's economy is highly fossil fuel dependent, with the main source of electricity being coal. It also has large reserves of uranium and small reserves of oil and gas. The second biggest energy carrier is imported crude oil (needed for the supply of liquid fuels for transportation) while moderate amounts of nuclear, gas and hydro contribute to the energy mix. The electricity generation mix is heavily dominated by coal (91%) with nuclear energy from Koeberg in the Western Cape making up an additional 5%. Open cycle gas turbines (0.1%) and pumped storage and hydro stations (2%) meet residual requirements.

within and outside the aegis of the Renewable Energy Independent Power Producers Procurement Programme), collaboration with Financial Intermediaries (FIs) and Energy Service Companies (ESCOs) to enhance energy efficiency. This component is fully in line with South African government policies and commitments to reduce GHG emissions. These initiatives have subsequently been included in the first cluster of interventions within government's 2010/2011 Industrial Policy Action Plan. They are also part of the strategic integrated projects (SIPs) of the National Infrastructure Plan (NIP) that have been developed more recently, a testimony to the long term institutional sustainability and policy support these initiatives have gathered.

23. In September 2010 the African Development Bank (AfDB) and International Finance Corporation (IFC), in consultation with stakeholders, took the decision to focus on sustainable energy and energy efficiency, as reflected in the programmatic proposals for the Sustainable Energy Acceleration Programme (USD 85 million) and the Energy Efficiency Programme (USD 15 million). The initial SWH-related programme component was put on hold with a view to put a proposal forward at a later date when there would be greater clarity on the overall framework for SWHs and clear investment opportunities. Ultimately, given the paucity of appropriate SWH-related opportunities, the private sector investments have essentially focussed on sustainable energy.

Status of original investment plan implementation

Status of approved CTF financing

Table 2: Summary of commitments for the SA-IP Phase 1 (USD million)

	WPP	CSP	PS	CTF IP 1	Balance
Total investment costs ¹⁰	445	783	-	-	-
<i>Total investment costs (revised planned for CSP)</i>	<i>375¹¹</i>	<i>1197¹²</i>	-	-	-
<i>Total investment costs (actual for WPP)</i>	<i>217¹³</i>				

¹⁰ The planned Total Investment Costs is based on the joint AfDB and IBRD submission (November 2010) to the CTF.

¹¹ The USD 445 million was revised in the AfDB PAR to USD 375 million, (May 2011) based on market estimates for the plant of USD 345 million and includes a figure of USD 30 million required to support connections of future wind power plants to the grid.

¹² As per Fitchner report (2011).

¹³ The figure of USD 217 million represents the cost of awarded contracts, and excludes interest during construction. Refer to Table 4 for details.

CTF investment (planned)	100	250	150	500	-
<i>CTF investment (actual)</i>	<i>100</i>	<i>250</i>	<i>45</i>	<i>395</i>	<i>-105¹⁴ (-21%)</i>

Co-financing/ Counterpart funding (planned)	345	350	1,200	1,895	-
<i>Co-financing/ Counterpart funding (actual)</i>	<i>275¹⁵</i>	<i>947¹⁶</i>	<i>1,050</i>	<i>2,204</i>	<i>+309 (+17%)</i>

Component 1: Sere Wind Power Plant (WPP)

Description:

24. The project consists of the construction and commissioning of the 100MW Sere Wind Farm at a site near Koekenaap in the Western Cape. It involves the supply and installation of wind turbine generators (WTGs), balance of plant civil works of the power plant, which include buildings, drains, landscaping, sewers, cable trenches, fencing, roads, and terraces and grid integration through the construction of a substation and 44 km 132 kV line. Cumulative emissions savings from the Sere Wind Power Project, based on an annual output of 298 GWh, would be 6 million tons of CO₂ over the 20-year life of the plant.

Implementation schedule/ Progress to date:

25. The project is now on track after delays at its inception especially with regards to fulfilling the conditions for entry into force of the loan facility (July 2012). Data on wind measurements for a continuous 12-month period was made available in April 2010, impacting on the proposed technical solution. After a review process of the technical specifications of the WTG resulting in some delays in procurement, all contracts for the Sere Wind Farm have now been awarded by mid-2013 and contractors have established their site offices and works are underway. Geotechnical investigations are nearing completion. The guaranteed date for the delivery of the first wind turbine generator (8 November 2013) will likely be delayed due to the delay in obtaining transport permits. Full commissioning of the facility (Operational Acceptance) has been guaranteed for 21 May 2014 under the WTG supply and installation contract.

Procurement:

26. There were delays in the various procurement processes as a result of (a) different procurement requirements by the financiers who will jointly finance contracts and (b) as a result of institutional arrangements with regards to the procurement technical

¹⁴ Though not actually committed yet, an amount of USD 5 million - part of the IFC- CTF resources- from the USD 105 million will be utilized under the aegis of the Energy Efficiency programme in Component 3 (private sector). The IFC-CTF project has received concept approval within IFC and is moving towards appraisal (October 2013). In addition, USD 42.5 million - the AfDB-CTF resources are expected to be utilized under the aegis of the Sustainable Energy Acceleration programme in Component 3 (private sector). Hence, the CTF financing available for re-allocation or re-prioritization is USD 57.5 million.

¹⁵ As approved by the financiers: AfDB, AFD and WB and includes the Eskom counterpart funding.

¹⁶ All co-financing approved except EIB which is scheduled for end 2013.

team. This was resolved through a joint agreement on procurement procedures and Eskom internal organisational review processes.

The procurement activities for the Sere Wind Farm have been split into four packages, with all four contracts signed by August 2013.

Table 3: Procurement and contract awarded- Sere Wind farm (USD million)

Package #	Description	Supplier	Contract value	Date of Contract Signature
1	Wind Turbine Generator Supply and Installation; and Plant Operation and Maintenance	Siemens Wind Power A/S, Denmark	197	02/2013
2	Civil Works	Raubex	5.6	03/2013
3	Substations and 132 kV line	JV Stefanutti Stocks & Powertech	10.2	6/2013
4	Owners Engineer (Execution Partner)	Gas Natural Fenosa Engineering	4.1	02/2012

Institutional set up:

27. The project was developed by the Project Development Department (PDD) within Eskom Enterprises and the Group and Construction Department (GCD) responsible for the complete procurement phase. Upon signing of a specific contract, the said contract was handed over to a project manager, assisted by the Execution Partner, under GCD for construction supervision and management. Once ready for commissioning, the operation of the power plant will be undertaken by the new Renewables Business Unit (RBU). Monitoring and impact evaluation of the overall project is the responsibility of RBU. The Senior General Manager (from RBU) is responsible for coordination and monitoring of progress of the overall project. The government of South Africa has also constituted an ad hoc inter-departmental Committee (DoE, DoEA, DPE and Eskom), which is expected to meet regularly for strategic guidance, monitor implementation and to provide oversight with respect to CTF-funded components including the Sere Wind Farm. Furthermore the CTF has been a regular agenda item of Director-General level bilateral meetings between DOE, DEA, and DPE.

Environmental Management:

28. *Environmental Impact assessments (EIA)*: The EIA for the Sere Wind Farm and its electrical interconnection line has been completed, showing that Eskom fully adhered to the country EA procedures, including scoping and public consultations. The site selected for the Sere project is sparsely populated and, with the exception of one small area at the north-western corner that the EIA recommends be avoided (and that Eskom has agreed to avoid), does not contain any unique or rare vegetation. Fauna will also not be affected. A process has been agreed on to deal with some

Physical Cultural Resources (PCR) of minor significance under the supervision of Heritage Western Cape. The single significant impact is the visual presence of wind turbines. Though the visual impact cannot be mitigated, the number of people affected will be small.

29. *Institutional arrangements*: The contractors have submitted and/or are finalising their environmental method statements (EMS) and have deployed environmental officers. The Environmental Control Officer is also on site. Authorisations have been granted for construction of roads, pipeline, power-lines, canals and for re-zoning by civil aviation (air space obstacles approval).

30. *Environmental Management plan (EMP)*: Since considerable advances in wind technology has occurred since the initial project design and new suppliers have become available on the local market; some amendments were deemed necessary in order to optimise the wind energy capture for the project. These amendments were approved as follows:

- i. October 2010: Authorisation to make use of towers of up to 120 metres (instead of 80m initially envisaged)
- ii. August 2011: Authorisation to make use of 67 turbines (instead of 100 turbines)
- iii. June 2013: Reduce the number of turbines from 67 to not more than 50 units (each not more than 120m in height); with increased rotor diameter from 90m (3 x 45m blades) to 106m diameter rotor (3 x 53m blades); and increased dimensions of turbine concrete foundations from (15m x 15m to 20m x 20m).

Financing:

17. Total (estimated) cost of the project: USD 445 Million
Total (reviewed) cost of the project: USD 217 Million

Table 4: Co-financing target levels and achievements for South Africa's CTF Investment plan Phase 1- Sere Wind farm (USD million)

Target	Planned value ¹⁷	Revised value (actual) ¹⁸	Variation (%)
Total investment	445 (100%)	375	- 16 % ¹⁹
Contracts	385	217 ²⁰	- 43% ²¹
Grid Connection	0	30	
Variance (including IDC)	60	128	

¹⁷ The planned values are based on estimated project cost in the joint AfDB and IBRD submission to the CTF (November 2010).

¹⁸ The revised values are based on the AfDB PAR estimate USD 375 Million, (May 2011) which includes a figure of USD 30 million to finance investments on the transmission grid in support connections of future wind power plants.

¹⁹ The variance the difference between the USD 445 (Joint AfDB and IBRD submission in 2010 and a revised market based estimate from the AfDB PAR conducted in May 2011, including the grid connection estimates.

²⁰ The figure of USD 217 million represents the cost of awarded contracts but does not include interest during construction.

²¹ The negative variance of (43%) has been computed by comparing the actual contract based costs, to the planned investment cost (basis of comparison should be without IDC, USD385m).

CTF investment	100 (22%)	100 (27%)	
Co-financing	310 (70%)	240 (64%)	-23%
Counterpart funding (Eskom)	35 (8%)	35 (9%)	

Table 5: Co-financing of Sere Wind farm as of August 2013 (USD million)

Lenders		Amount Planned	Amount Revised
CTF	AfDB	50	50
	WB/IBRD	50	50
AfDB		50	45
WB/IBRD		110	65
AFD		130	130
EIB		20	0
Eskom		55	35
Total		445	375

31. As of June 2013, less than 1% of the funds available were disbursed under this project. However, the Sere wind project is expected to fully disburse before the final disbursement date. It is estimated that disbursement level will reach 50% by the end of the 1st quarter of 2014.

Table 6: Indicative disbursement forecast of Sere Wind farm (USD million)

Lenders		Actual to date (06/2013)	3rd quarter 2013	4th quarter 2013	1st quarter 2014	2nd quarter 2014	3rd quarter 2014	Total (variation²²)
CTF	AfDB	0	5.30	5.19	7.62	28.21	6.64	52.96 (+6%)
	WB/IBRD	0	2.24	3.19	3.76	11.42	3.07	23.68 (-52%)
AfDB		0	0	4.18	6.14	22.72	5.35	38.39 (-14%)
IBRD		3.49	0.55	0.72	4.98	16.91	4.34	30.99 (-52%)
AFD		3	47.76	0	18.12	0	0	68.88 (-47%)
Eskom		-	-	-	-	-	-	- ²³
Total		6.49	55.852	13.28	40.62	69.26	19.4	204.9 (-42%)

32. It is foreseen that there will be an outstanding amount from the loan as some of the contract amounts have come below the financing plan budget items (sometimes quite considerably). There are no proposals yet on how the savings could be used.

Impact:

33. The overall information required to develop a KPI aggregated table on impact is not yet available due to the late project implementation start.

²² Variance between disbursement forecast and amount of co-financing available (per lender)

²³ No information available from Eskom at this stage.

34. *Impact on GHG reduction potential:* So far none can be traced due to the status of the project. However it is noted that emissions targets have been adjusted from initial IP to reflect new CTF reporting requirements. Eskom still needs to update its result-level indicators to match new requirements.

35. *Impact on energy generation:* Cannot yet be measured but estimates of annual energy production have increased due to the selection of wind harvesting technology that better optimises the available wind resource than was available earlier.

36. *Developmental impact:* The KPI for this in the IP is the number of direct job created (disaggregated construction/ Operation). The only revised assessment of development impact is an increase of direct jobs created - up to 230 at peak construction.

Economic and financial analysis of project:

37. AfDB will only review this at project completion through the Project Completion Report process. Eskom has not provided a revised analysis.

Replication/scale up potential:

38. The proposed design is a two-phase development of wind turbines in the Province. Phase one (proposed sub-component) comprises wind turbines with a total generating capacity of 100 MW, and an expected annual generation of about 298 GWh with a load factor of about 26 percent. In addition, transmission lines and substations will be constructed to allow other renewable projects in the area (specifically under the IPP program) to connect to the grid. Along with the second phase of development, the facility is expected to have a total generating capacity of 200 MW.

39. Both the South Africa wind industry and government is confident that the wind energy target of 9 000 MW by 2030 can be reached and expanded, as shown by the success of the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) bid Rounds 1 & 2. In the first two rounds completed, round 1 procured MW1416 with 28 successful bidders and round 2 procured MW1043.9 with 19 successful bidders. Overall, the IPP Programme is expected to attract investments of around R100 billion between 2012 and 2016.

Way forward:

40. Despite initial delays, the implementation processes are now satisfactory and on schedule to achieve overall project completion milestones. The project will deliver the anticipated results as per the revised timeframe of August 2013 both in terms of installed capacity and development impact. However, it is uncertain if the larger GHG emissions outcomes will be met, as this will depend largely on the actual wind energy resource and facility availability.

Component 2: Upington Concentrated Solar Power Plant (CSP)

Description:

41. The project consists of the development of a grid-connected 100MW concentrating solar thermal power plant at Upington in the Northern Cape. It involves the supply and installation of a central receiver technology using molten salt as storage and heat transfer medium, of a turbine generator, balance of plant, civil works of the power plant (buildings, drains, landscaping, sewers, cable trenches, fencing, roads, and terraces) and grid integration through the construction of a 132 kV line.

Implementation schedule:

42. The planned completion and commissioning has been delayed, updated to May 2019 (from February 2017 at the project appraisal stage i.e. + 28 months). Delays have been caused mostly by procurement challenges and difficulties in meeting co-financing requirements in terms of technical solutions / design review processes and governance. The resulting delays have consequently increased project cost estimates. In addition the delays have also resulted in a delay in concluding the other co-financing agreements, which is one of the contractual specific pre-conditions of the project. Eskom must meet this condition in order to allow for disbursement under the CTF loan. AfDB is however only funding the EPC contract, which means disbursement against the AfDB CTF loan will only take place once the EPC contract is in place.

Procurement:

43. Differences in approach on procurement strategies and modalities are partially responsible for the delays incurred since the inception of the project. Current delays result from awaiting approval for a waiver from the SA Preferential Procurement Policy Framework Act 5 of 2000 (“PPPFA”)²⁴, which came into effect on 7 December 2012. The new legislation has therefore had an impact on packages that had not commenced the procurement process prior to this date and includes all the contracts for the CSP Plant, including the EPC, except the Owners Engineer. This issue was expected to be finalised by September 2013 and the pre-qualification document to be published in October 2013 for a contract award in July 2015 (hence a 24-month delay from appraisal timeline). A follow up meeting and clarification letter was sent to National Treasury and Eskom is awaiting feedback on when this issue will be finalised.

Table 7: Summary procurement status under component 1 (CSP)

Package #	Description	Supplier	Contract value/ TMLE
Package 1:	Owner’s Engineer	JV between Tractebel, PDNA, and ATA	USD 4 million June 2012 to February 2014 (To be renewed)
Package 2:	Solar and power block/ Balance of plant and critical infrastructure	Tbd	Est. USD 820 million Est. Start up date: November 2015 Est. Completion date: May

²⁴ The initial waiver granted expired in December 2012.

			2019
Package 3:	Miscellaneous Works (Non-critical infrastructure)	Multi-contract	Est. USD 60 million Est. Start up date: November 2015 Est. Completion date: May 2018
Package 4:	Electrical integration and auxiliary power	To be determined	Est. USD 8 million Est. Start up date: November 2015 Est. Completion date: May 2018

44. The procurement documentation is at an advanced stage of development and the pre-qualification documents for EPC tender (package 2) are ready for publication as soon as the PPPFA waiver is approved. Similarly, preparatory procurement processes are underway for packages 3 and 4, which will be awarded in parallel to package 2 implementation. It is foreseen that packages 2, 3 and 4 will be awarded not later than Q3 2015. Commercial operation of the plan is foreseen by mid-2019.

Environmental Management:

45. A Record of Decision (EIA approval) was obtained in September 2007. However, based on the 2010 Fichtner study, it was decided that a revision of the EIA was appropriate as the approved ROD was deemed too specific in terms of tower height, number of heliostats and field size. The revised EIA was approved in July 2013. The area required on the property has been re-zoned from agricultural use to industrial use, and all other regulatory approvals have been identified and will follow the appropriate processes to seek the required approvals/permissions.

46. As part of the plan to fast track the construction commencement date for early works, permission has been obtained for the construction of the water line to pass under the national road. The EIA for the road construction has been included in the Transmission Substation EIA, with approval anticipated in Q4 2013.

47. *Institutional arrangements:* As works have not yet started, environmental method statements (EMS) have yet to be adopted and environmental officers/ environmental control officer have yet to be appointed/ deployed on site.

48. *Environmental Management plan (EMP):* The EMP is in the process of being compiled and will be finalised in accordance with the requirements of the Environmental Impact Assessment approval obtained.

Financing:

49. Total (estimated PAD) cost of the project: USD 760 Million (according to IP, 2009, and excluding Interest During Construction of \$23 million as per the WB's PAD). Total (reviewed) cost of the project: USD 1 197 Million (+ 58%) (Fichtner's report, 2010). The main reasons for the increase are due to the increase in contingency and the inclusion of interest during construction into the funding plan. The Fichtner study estimated the total project cost to be USD 785 million (+- 25%). A decision was taken to increase the project funding on the conservative side by adding the 25%

contingency. This increased the fund requirement to USD 981 million. The inclusion of IDC and forward cover increased the total cost to USD 1 197 million.

Table 8: Co-financing target levels and achievements for South Africa's CTF IP Phase 1- CSP

Target	Planned value ²⁵	Revised value ²⁶	Balance (%)
Total investment	783 (100%)	1 197 (100%)	+58%
CTF investment	250 (32%)	250 (21%)	-
Co-financing	510 (65%)	720 (60%) ²⁷	+140%
Counterpart funding (Eskom)	23 (3%) ²⁸	227 (19%) ²⁹	+19%

Table 9: Co-financing of CSP component as of August 2013

Lenders		USD Millions (planned)	USD Millions (actuals) ³⁰
CTF	WB/ IBRD	200	200
	AfDB	50	50
	IFC	-	-
	AfDB (PS)	-	-
AfDB		180	220
WB/IBRD		150	195
IFC		-	-
EIB		30	75
KfW		130	100
AFD		20	130
Private sector		-	-
Eskom		23	227
Total		783	1,197

Disbursements:

50. The disbursement plan will be agreed amongst the lenders once the costs are at a greater level of accuracy and all the loan amounts have been finalised with all the co-financiers. The French Development Agency loan of USD 130 million has been approved and signing will commence within the next month. The KfW loan agreement of USD100 million was signed in August 2013. The EIB loan agreement of USD100 million is to be signed by June 2014. Due to contractual obligations contained in the various loans and some lenders prescribed timeframe for disbursements, it was indicated that specific items could be singled out for a specific lender. The OE related expenditure for instance is financed under the World Bank CTF loan and so are the EPC costs (package 2). Similarly, the AFD has also

²⁵ These estimates are based on the joint Submission by IBRD and AfDB for CFT Funding (November 2010)

²⁶ As per Fitchner report (2011)

²⁷ Refer Table 9 for detailed breakdown of co-financing.

²⁹ Business case approval for USD 1 197 million scheduled to take place in July 2014 was postponed due to procurement delays and should be finalized for this amount by early 2015.

³⁰ All co-financing approved except EIB which is scheduled for end 2013

earmarked some of the pre-construction activities for funding. Given the restriction on the procurement process, AFDB will only be financing the EPC costs (package 2).

51. *Disbursement on CTF funds:* As of August 2013, none of the CTF funds available were disbursed. One of the four conditions to be met for the first disbursement under CTF contract has still to be fulfilled. This condition, which relates to securing the full financing of the CSP is expected to be achieved by June 2014 the earliest.

52. The following high-level financing plan was developed based on the current estimated costs, and it provides an indication of the disbursements profile. It is however important to note that this plan will be updated once the project costs estimate has a greater level of certainty and the various terms and conditions for disbursement have been finalised.

Table 10: Financing plan per project items and lenders (USD million, est. Sept. 2013)

Project Component	Costs	Financing Plan				
		IBRD	AFDB	CTF - IBRD	CTF - AFDB	Eskom & Other Lenders
Component 2: Upington Concentrating Solar Power						
Main CSP Package	696	141	172	116	50	217
Miscellaneous Plant	86	17		14		55
Transmission and Distribution Upgrade	9	2		2		5
Owners Engineer	39			39		
Owners Development Costs	42					42
Contingencies @ 25% of Base Costs*	218	35	48	29		106
Interest During Construction (IBRD, CTF and identified lenders); excluding Eskom's Cost of Balance Sheet Financing	108					108
TOTAL – component 2	1,197	195	220	200	50	533
TOTAL	1,551	260	265	250	100	677

Impact:

53. *Impact on energy generation:* Concept and basic designs have been completed by the Owner's Engineer and verified by Eskom Engineering. The feasibility of the plant design was again reviewed and risk analyses completed. Given the quantity of storage, the plant will have a capacity factor of at least 60 %. It will generate approximately 525 GWh of clean energy annually. Contrary to conventional power plants, the auxiliary load for this plant will be drawn from the national grid. Estimating the aux load at 10 % of power generated, reduces the net send out of the plant to 470 GWh per annum.

54. *Impact on GHG reduction potential:* Eskom average CO₂ emission is just below 1 kg/kwh produced. With a net send out power of 470 GWh per annum, the plant will offset 450 000 tonnes of CO₂ per annum, and 11.25 million tonnes of CO₂ over its 25 year life.

55. *Developmental impact:* A socio economic study was conducted in 2011. The study confirms potential for local supply and job creation under various scenarios. The text below is taken directly from that study report for what was considered a “high road scenario” which assumes mirrors and steel structures are sourced locally.

Impact on employment:

56. During the construction of Solar 1 about 12 164 FTE employment will be created. This does not mean that more than 12 thousand employment positions will be created at one point in time during the construction period. It rather means that during the establishment stage 12 164 employment person-years will be created, which equates

to about 4 866 workers being employed for the duration of the construction period. In reality though, the number of temporary jobs created as a result of the project's spending will vary throughout the years and will follow a project expenditure schedule.

57. The greatest number of FTE employment will be created through indirect effects, i.e. amongst companies and businesses that would supply goods and services to the construction and the companies that would provide inputs to these suppliers. It is estimated that 6094 employment person-years could be created along the supply value chains of companies that would provide goods and services for the establishment of the solar project. Income effects derived from increased household spending are expected to stimulate the creation of an additional 4 766 FTE jobs. On site activities will create direct 1 304 FTE jobs. Given that the construction of the facility will last for two and a half years, an average number of 522 workers are expected to be on site during that period.

Table 11: FTE employment created during construction – high road scenario

Year	Direct	Indirect	Induced	Total	% Share
Local economy	492	95	31	618	5.1%
Rest of the Northern Cape	-	651	218	869	7.1%
Rest of SA	812	5,347	4,517	10,676	87.8%
Total in SA	1,304	6,094	4,766	12,164	100%
Average annual employment position	522	2,438	1,906	4,866	-

Table 12: Impact on employment during operations

Year	Direct	Indirect	Induced	Total	% Share
Local economy	72	1	4	77	23.6%
Rest of the Northern Cape	-	5	31	36	11.0%
Rest of SA	-	113	102	214	65.4%
Total in SA	72	118	138	328	100%

58. **Economic and financial analysis of project:** The levelised cost was calculated as 0.1943 USD/kwh using the following parameters:

Plant life:	25 years
Inflation rate:	0%
Loan term:	25 years
Loan rate:	4%/ year
Debt fraction:	83.5%
Discount rate:	5.2%
Annual met electricity production:	477 GWh/year.

The LCOE should be seen as indicative and is subject to change depending on final plant costs, exchange rate and other parameters shown above.

Replication/scale up potential:

59. The Owner's Engineer contract places great emphasis on training and development of Eskom staff in order to allow Eskom to function effectively as owner's engineer on subsequent CSP projects. This training and development has progressed exceptionally well with counterpart Eskom staff sitting with and working with the owner's engineer team for hands on, on the job training. The training plan included classroom based training and a trip to Spain to visit existing operating plants.

60. The OE also optimised the layout of the land already procured by Eskom to accommodate additional CSP plants. The functional specifications to be issued for the first plant will include options of adding additional CSP plants onto the existing site (Olvenhoutsdrift, Upington). In addition, Eskom has also contracted Stellenbosch University to provide resource analysis services with the intention of identifying and procuring additional sites suitable for CSP, wind and PV.

61. With regard to knowledge management, all project information is stored in a central hub called Hyperwave that is accessible to all project staff. This is updated on a regular basis and serves an important role in ensuring knowledge capture and storage for future use.

Revised assessment of risk and mitigating measures.

62. Given the fact that this is a first of a kind project for Eskom, a decision was taken to minimise the risk by procuring the main plant through an "Engineer, Procure and Construct" (EPC) contract. This will provide a turnkey solution to Eskom on the main plant (package 2) and will ensure that all integration issues are managed by a single contractor that wraps the project and provides performance warranties and equipment guarantees as specified in the bidding document. In order to address the risk of insufficient competitive bids, a decision was taken with all co-financiers that the World Bank two stage international competitive bidding process will be adopted that allows for technical dialogue in the first stage to accordingly revise the final second stage bidding documents to accommodate all prequalified suppliers, within the constraints of the functional specifications. A prequalification was deemed necessary after the phenomenal response to the Request for information (RFI) issued early in 2012.

Way forward:

63. Despite initial delays, the implementation processes seems now on track pending the successful and swift resolution of the current procurement blockage (the current PPPFA waiver for the EPC) and the process for procurement package 3 and 4. The project will certainly deliver the anticipated results as per the revised timeframe of August 2013 both in terms of installed capacity and development impact.

Component 3: Private Sector**Description:**

64. Under this component an amount of up to USD 150 million has been allocated for implementation by the private sector. There are 3 sub-components to this component of the Investment Plan: (i) Renewable Energy IPP Support that is realized through Sustainable Energy Acceleration Program (SEAP); (ii) Commercial Bank Lending for

Energy Efficiency (EE), and (iii) support to the implementation of Solar Water Heating (SWH) projects. Available resources were allocated to each sub-component, as indicated below:

Table 13: Original allocation of resources per lender/per area/types of intervention (USD million)

Item	Sub Component 1 (SEAP)	Sub Component 2 (EE)	Sub Component 3 (SWH)	Total
Investment	83	13.15	50	143.15
IFC	41.5	6.575		
AfDB	41.5	6.575		
Advisory services grant	1	1		2
IFC	0.5	0.5		
AfDB	0.5	0.5		
Implementation and supervision budget	1	0.85		1.85
IFC	0.5	0.425		
AfDB	0.5	0.425		
Subtotal	85	15	50	150
Subtotal IFC	42.5	7.5		
Subtotal AfDB	42.5	7.5		

Sub-component 1: SUSTAINABLE ENERGY COMPONENT³¹

Description:

65. Sustainable Energy Acceleration Program (SEAP) – a joint initiative of the IFC and AfDB developed under this sub-component – aims to support private sector large scale sustainable energy (SE) projects, including cogeneration energy efficiency projects and wind and solar renewable energy projects. The program seeks to encourage transformation of the private SE sector by establishing a series of direct, project level interventions in the wind, solar and cogeneration sectors, all of which are nascent but offer significant potential in South Africa. These initial investments will help to demonstrate that private sector participation in the power sector, and more particularly the SE power sector, can be successful in the South African context (thereby helping to reduce risk for future investors) while also addressing some of the early entrant barriers related to establishing precedents and reducing costs.

66. The SEAP has already generated three sub-projects, two of which are the landmark CSP investments with the total installed capacity of 150 MW and the total amount of financing mobilized over USD 1.3 billion. The plants will enhance the supply of reliable, sustainable electricity and improve energy security in South Africa.

³¹ This sub-component is referred to as the “Sustainable Energy Acceleration Programme (SEAP)” in the programmatic proposal which was approved in 2010.

They will be jointly owned by Abengoa and South Africa's state-owned Industrial Development Corporation.

67. The advisory services sub-project of the SEAP is the Africa Renewable Energy Advisory Services (AREAS) work. The overall aim of the AREAS is to assist the Government of South Africa (GoSA) to meet its targets for universal electrification in the country by 2020 by addressing barriers to private sector involvement with a particular focus on distributed generation (non-grid) renewable energy (RE). The sub-project is part of a larger IFC's AREAS regional program that also includes Kenya (with other source of funding) and plans to expand to other sub-Saharan countries.

Rationale:

68. This program is in line with policies of the Department of Energy, which intends to bring 10,000 MW online from renewable sources by 2030, framing South Africa's strategy for energy independence. The CSP sub-projects form a part of this strategy and have additional developmental benefits in line with government strategic frameworks with regards to employment levels (on average, creating approximately 1,400 local construction jobs per annum and about 70 permanent operation jobs) as well as community development (as a result of a direct ownership of the plant companies by established special purpose community trusts). In addition, the program supports the strategy's targets to (a) reduce the country's carbon dioxide emissions by about 498,000 tons each year and (b) demonstrate the viability of financing large-scale RE projects and the suitability of pursuing solar power in South Africa.

Financing:

69. The estimated overall co-financing for this component stands at over USD 1.2 billion and made up of local co-financing and IFC own resources (of USD 215 million).

Table 14: Commitments for Sub-component 3: SEAT (USD million, Sept. 2013))

Lenders		CTF allocation (Planned)	CTF commitment (Actual)	Balance
CTF	IFC	42.5	42.0 (100%)	0.5 ³² (1%)
	AfDB	42.5	0	42.5 (100%)
Total		83.0	42.0 (49 %)	43.0 (51%)

Implementation schedule / progress to date:

70. *Loan:* Loans to Abengoa Solar SA (Pty) Ltd and Son Rivieren (Pty) Ltd in partnership with the IDC for the construction of greenfield CSP plants in two sites in the Northern Cape – Pofadder and Upington – have been finalised. The total cost of the project is estimated at USD 1.3 billion. The projects are the first CSP plants to be constructed in sub-Saharan Africa. They are on schedule and operational stage is expected to begin in 2015. Nine million tCO₂e of cumulative emissions savings is confirmed over the projected 20-year lifespan of the plant.

³² This is for the implementation and supervision expenses

71. Site 1: Abengoa !KaXu - IFC blended USD 26.5 million of CTF concessional funds to support the construction of a 100 MW parabolic trough CSP project in the town of Pofadder. IFC invested USD 75 million from its own account alongside CTF's contribution as part of the USD 860 million project. As a result of this project, 268 000 tCO₂e per year of GHG emissions are expected to be avoided.

Table 15: Overall progress for CSP !KaXu site ³³(to end 08/ 2013)

Items	Progress
Engineering	93%
Purchasing	96%
Manufacturing and supply	66%
Civil construction	49%
Mechanical assembly	9%
Electrical assembly	2%
I&C assembly	3%
Commissioning	0%
Overall construction	18%
Total project	44%

72. Site 2: Abengoa !Khi – USD 15 million in concessional funds made available from the CTF to support the construction of a 50 MW steam receiver power tower CSP project in Upington. IFC invested USD 69 million from its own resources alongside CTF's contribution for a total provisional estimated cost of USD 445 million. The construction of the Khi Solar One tower was completed in August 2013 and the project is over 50% complete. The next part of the project requires the installation of the mechanical structure and piping in and around the tower. The turbine is transported to site to be installed in the beginning of October. In parallel over 4 thousand heliostats will be mounted in the solar field. Khi Solar One has also established an economic development plan to create employment and stimulate the local economy. One of the measures consists of providing local communities with the opportunity to directly participate with a stake in the project companies. The Khi Community Trust was established for this purpose and owns 20 % of the project entities and 8% of the EPC entities. This Community Trust, along with the project companies, is responsible for providing support to improve skills and know-how in areas such as entrepreneurship, leadership, education, infrastructure and personal development for the members of the target communities. The project will result in avoiding 174 000 tCO₂e per year.

73. *Technical assistance:* Technical assistance was mobilised for the Department of Energy under the CTF-IFC advisory services grant to help the government develop a new national Electrification Roadmap that includes increased supply of off-grid renewable energy. South Africa aims to achieve universal electrification by 2025, which will require broadening the technology options that are employed, and enhancing the planning and delivery processes applied by electrification partners. A greater share of off-grid renewable energy in South Africa's electricity mix will contribute positively to the country's national sustainability agenda through its social

³³ Khi Solar One: Executive Summary Construction Progress, October 2013.

and environmental benefits. This technical assistance support to the South African Integrated National Electrification Programme (INEP) is part of IFC's Africa Renewable Energy Advisory Services (AREAS) programme. INEP's electrification target at its inception in 2001 was 92% (on households) by 2014 and it is being reviewed along with implementation plans. Between 1994 and 2012, more than 5,6 million households were connected to the grid and traditionally electrification focused on formal housing. By 2012, 76% of formal household were electrified. However, given the high cost of connecting sparsely populated remote communities to the grid, there is broad consensus that high-quality off-grid solutions will need to remain part of the strategy going forward, and may account for up to 10 % of new connections. Moreover, there is need to reduce the burden on government finances, where possible, by leveraging the private sector in the delivery of systems. In the next phase unproclaimed areas (informal settlements and remote rural areas) will be targeted through funding and subsidies and in the future non-grid electrification will not be restricted to concessionary areas.

74. The sub-projects objectives are three-fold:

- i. To support the design, syndication amongst stakeholders and, ultimately, approval by the Government of South Africa (GoSA) of a new National Electrification Road Map and associated Non-grid Implementation Plan, which will result in a clear way forward for the electrification of 3.4 million households across the country by 2020;
- ii. To support the establishment of a Non-grid Implementation Mechanism by the DoE to implement the non-grid connected component of the new National Electrification Road Map; and
- iii. To provide advisory services to private sector companies testing business models for delivery of off-grid electricity services to households. These efforts are expected to lead to an increase of about 10 000 non-grid RE household connections (reaching about 50,000 people) and reduction of approximately 1000 tCO₂e/year emission reduction by June 2015.

75. Additionally, a new component is being developed which aims to provide advisory services to private sector companies that are developing business models for non-grid electrification.

76. The total sub-project cost is USD 2 million with USD 0.5 million of CTF funds. The co-financing is secured and includes USD 0.46 million from the South African government.

Sub-component 2: ENERGY EFFICIENCY (EE) COMPONENT

Description:

77. A joint initiative of the IFC and AfDB, the sub-component aims to support private sector energy efficiency (EE) projects through collaboration with Financial Intermediaries (FIs) and Energy Services Companies (ESCOs). More specifically, the programme developed under this sub-component seeks to encourage transformation of the energy efficiency sector by establishing a source of funding for on-lending by

FIs to small and medium-sized industrial operations for investments in energy efficient equipment.

Rationale:

78. This initiative is expected to yield important developmental impacts, specifically to promote the development of sustainability businesses through providing long term financing to energy efficiency projects. It is also consistent with the policies of the GoSA and will directly support the GoSA's specific goal of employing EE/DSM to reduce electric power consumption by 12% (approximately 110,000 GWh) by 2015. Current South Africa's Investment Plan identifies EE as a key strategic area for application of CTF resources in both the public and private sectors.

Financing:

Table 16: Commitments for Sub-component 2: EE (USD million)

Lenders		CTF allocation (Planned)	CTF commitment (Actual)	Balance
CTF	IFC	7.5	2.3 (31%)	5.2 (69%)
	AfDB	7.5	0	7.5 (100%)
Total		15.0	2.3 (17%)	12.7 (85%)

Implementation schedule / progress to date:

79. One project was finalized under this sub-component with Mercantile Bank Holdings Limited (MBHL) to support the expansion of the Small and Medium Enterprises (SMEs)/Mid-market clients lending and promote development of sustainability businesses. MBHL provides long term funding to mid-market and SME clients for projects that result in environmental benefits and GHG emission reduction throughout South Africa. The project consists of a senior loan of USD 2.3 million in concessional funds from the CTF and IFC's own investment of USD 8.2 million alongside CTF's contribution.

Sub-component 3: SOLAR WATER HEATER ROLL- OUT

80. This sub-component was designed as joint initiative of the IFC and AfDB with the aim to support the implementation of Solar Water Heater (SWH) projects undertaken by commercial and industrial users and potentially private households through initiatives led by municipalities (local governments). The sub-component envisaged the following: (i) financing end consumers through intermediaries such as municipalities, ESCOs or FIs; and (ii) provide long-term financing to SWH manufacturers through FIs. IFC/AfDB's private sector SWH initiative is addressing the support needed by SMEs, the commercial, industrial, and municipal sectors in the scale up of SWH projects in South Africa.

81. Both IFC and AfDB have undertaken business development efforts to establish a pipeline of investment projects and have conducted a number of consultations with potential business partners, project sponsors, and financiers. IFC has detected limited

interest from banks and financial institutions and that led to challenges in developing deeper engagement. Thus IFC does not foresee investments in the sector in the near future that would merit CTF funds as articulated in the original CTF South Africa Investment Plan. With a view to accelerate the execution of CTF resources, IFC is making available its unused USD 25 million of CTF resources from the SWH Program to the AfDB to be allocated to other priority programs or projects.

82. Similarly, the AfDB has also held discussions with relevant stakeholders, including significant discussions with one of the large municipalities to support their SWH rollout program. However, following the municipality's recent changes to the structure of their SWH programme, the AfDB does not see an opportunity to utilise CTF funding during the course of the following year and hence proposes to reallocate their USD 25 million earmarked for solar water heaters to support renewable energy or transport solutions which show more promise in the near term.

Context and rationale for the investment plan update - new legislation/ policies and trends

83. Since the approval of the initial IP, South Africa has experienced significant shifts in the policy and regulatory environment. In 2009, at the UN Climate Change Conference in Copenhagen, President Zuma committed the South African government to targets of reducing carbon emissions by 34% below business as usual (BAU) by 2020 and 42% by 2025.³⁴ This was followed by two key policy and planning documents viz. (a) the National Climate Change Response (NCCR) White Paper, effective since 2011, which mandates the different sectors to address GHG emissions and (b) the first National Development Plan (NDP) of 2013 which asserts that development challenges must be addressed "... in a manner that ensures environmental sustainability and builds resilience to the effects of climate change, especially in poorer communities" (page 197). More recently, this year National Treasury released the carbon tax policy for public and stakeholder comment, which is now in the process of being finalised before submission to the national legislature for debate and adoption. It is foreseen that the carbon tax will promote a shift in consumer and investment behaviour and incentivise technology change in the energy and transport sectors, among others.

Energy: Policy Changes and Programmes

84. A series of rolling black-outs in 2008, caused partly by a rapid growth in electricity demand without the concomitant investment in capacity development, resulted in the South African government consolidating efforts to rationalise the legislative and regulatory framework for energy and energy-related environmental issues. The government focused on bringing the country's electricity system back into balance.

³⁴ At COP 15 in Copenhagen the South African Government committed to reduce its carbon emissions by 34% in 2020 and 42% by 2025, conditional on finance, technology and capacity-building support from the international community. South Africa will continue the use of fossil fuels in the short to medium term while making a gradual shift to non-fossil fuel energy sources over the long term.

85. The 2010 Integrated Resource Plan (IRP2) bases its proposed roadmap for new-build generation on Eskom's moderate demand forecast that assumes a doubling of electricity demand in the next 25 years³⁵. The plan includes a total of 17.8 GW renewable energy to be achieved by 2030, divided into solar photovoltaic (8.4 GW), concentrated solar power (1 GW) and wind (8.4 GW).³⁶ From the demand side perspective, the IRP2 incorporates known demand side management programmes including commercial, industrial and residential, for a total savings of 23TWh by 2019.

86. In terms of supply side management, the focus has been to increase generation capacity on a massive scale to meet rising electricity demand. This is being done in a number of ways, with medium term and longer-term strategies, supported by energy and industrial policies and strategies. The REIPPPP was given priority to procure MW3725 through 5 bidding rounds, with job creation and socio-economic and local content weighting ranking very high (30% of the total) in the evaluation of bids. As indicated earlier, this programme has been highly successful.

87. Additionally, with a substantial World Bank loan (with a renewable energy component) and as a longer-term measure, government initiated the two mega coal-fired power stations of Medupi and Kusile. Government also established the South African National Energy Development Institute (SANEDI), tasked with implementing the South African National Energy Research and Development Strategy and with developing practical guidelines for how the country can best take advantage of clean and renewable energy technologies that fully exploit South Africa's natural resources. At the same time, government's Industrial Policy Action Plan (IPAP2) aims to develop South Africa's renewable energy industries to create growth and jobs, and outlines the need to seek international financing to boost renewable energy production capacity.

88. A significant development is the commitment to invest R827 billion in building new and upgrading existing infrastructure over the three years from 2013/14 (Minister of Finance, 2013 Budget Speech) to give effect to the National Infrastructure Plan of 2012. The biggest chunk of the investment in infrastructure will come from Eskom, which will invest R205.1 billion over the three years up to 2015.

89. The REIPPPP Programme currently underway has received an overwhelming response from renewable energy developers. Launched in August 2011, successful bids were awarded before the end of 2011 (window 1) for contracting end of 2012 and in May 2012 (window 2) for contracting mid-2013. The third bid awards will be made in October 2013 for contracting in July 2014³⁷. For the first window, 28 projects (18 solar PV, 2 solar CPS and 8 wind) were approved with a combined allocation totalling 1415MW. In the 2nd window, 19 projects were selected (9 solar PV, 1 solar CPS, 7 wind and 2 small hydro), which should see a capital investment of R28 billion, totalling 1,043.9 MW.

³⁵ Under the IRP, Eskom is expected to continue with the current build programme and completion of the Return-to-Service programme (RTS) of the previously mothballed coal-fired power stations.

³⁶ Government also plans to provide 9.6 GW of new capacity through six new nuclear power plants.

³⁷ www.ipprenewables.co.za accessed October 6, 2013

90. Following global pricing trends, it has been shown that the costs of renewables have decreased over the two first bidding windows. The third window bid awards will be announced in October 2013. It is expected that the price of renewable energy to be produced by the IPP will continue to fall and in the medium to long term be in line with the selling price of coal-generated electricity. The continued CTF investment in RE technology is necessary to support this pricing trend to mainstream investment in clean energy generation.

Table 17: Average RE prices in the REIPPPP windows 1&2 (ZAR/kWh)

Technology	Average price window 1	Average price window 2
Solar PV	2.75	1.65
CSP	2.68	2.51
Wind	1.14	0.89

91. More recently in 2013, three key pieces of legislation will have an important impact on electricity generation, renewable energy and energy saving in South Africa viz. (a) the Independent Systems and Market Operator Bill (ISMO) which aims to remove any potential conflict of interest which may otherwise exist in a vertically integrated Eskom and to facilitate the regulation of all IPPs (b) the Electricity Regulation Second Amendment Bill that provides a regulatory framework to promote IPP participation and (c) the Carbon Tax Policy Paper and Draft Legislation which aims to institute a carbon tax on January 1, 2015³⁸. The gradual introduction of a carbon tax is viewed as part of a broader package of interventions to reduce South Africa's greenhouse gas (GHG) emissions rather than just a revenue increasing exercise.³⁹

Transport: Policy Changes and Programmes

92. Two commitments played a catalytic role in beginning the process of transforming transport in South Africa, namely, commitments to FIFA on improving the public transport system in order to secure the hosting of the 2010 World Cup and on COP17 in Durban in 2011. This boosted policy changes and investment in public transport to address the proliferation of (poorly regulated) informal taxis in response to rapid urbanisation. In addition, the trade and logistics sector have raised serious concerns about the deteriorating freight transport infrastructure, leading to congestion and high transport costs as well as emission levels. The policy drive towards modal shift from road to rail evolved as a result as well as the recognition by the sector of the need to address GHG emissions.

93. The national DOT is facilitating the transformation and implementation of major transport infrastructure projects through the National Infrastructure Plan. This plan

³⁸ It proposes a rate of ZAR 120/t of carbon dioxide equivalent, increasing at 10% a year during the first phase, from 2015 to 2019.

³⁹ This is proposed over and above the carbon emissions tax of 2010, imposed on all new passenger vehicles and adding ZAR 75 for every gram of CO₂ a new car emits above 120g/km per kilometer.

prioritises investment in infrastructure that promotes growth and employment and has the 18 Strategic Integrated projects (SIPS) as critical infrastructure programmes identified to fast track resourcing and implementation.

94. The National Transport Master Plan (NATMAP 2012) builds on the National Transport Strategy and Action Plan of 2007 and is currently under consideration by Cabinet. It identifies a need to continuously upgrade passenger and freight infrastructure in an innovative, flexible, economically and environmentally sustainable manner. A key objective of NATMAP is to provide energy efficient transport and to reduce the carbon footprint of transport, through an integrated and multimodal passenger transport system.

95. Provinces, supported by the NDP and the New Growth Path (NGP), launched green economy programmes and strategies to support intermodal coordination such as the BRT services (e.g. in Gauteng linking passenger rail with the BRT system in Johannesburg), fuel switching, green cab, smart mobility (Western Cape) and investment in non-motorised transport infrastructure. In 2007, the DoT launched the GHG inventory database⁴⁰ following 2006 IPCC guidelines, and a 2012/2013 inventory is underway. The eThekweni Municipality (Durban) commissioned its own GHG emission inventory in 2011 which revealed transport as the largest GHG emitter (37%).

96. South Africa introduced an upfront emission tax based on supplier specifications of emissions. In addition the proposed introduction of carbon taxes on industry (petroleum industries and refineries) is likely to result in price increases. In the public sector organisations that utilise high numbers of vehicles these cost increase could result in squeezing other recurrent expenses. Thus some provinces have commissioned pilot studies on fuel switching for its vehicles to assess the benefits of up-scaling cleaner fuel.

Phase 1 Update: Proposed revision to the Investment Plan

97. The OECD's 2013 Economic Survey Report on South Africa argues that while the emerging policy framework for addressing climate and environment issues is sound, implementation has been slow. To address the capacity constraints (both human and financial), concerted effort has been made to attract increased private sector participation in energy generation and infrastructure development. Recent policy instruments enabling increased private participation and technical assistance programmes have demonstrated speedy success in implementation, notably in the RE programmes (REIPPPP). While renewable energy generation has gained significant momentum, its up-scaling and distribution requires additional financial and technical support. Other programmes such as the large-scale roll out of SWH retrofit, is in the process of addressing its institutional constraints.

⁴⁰ South African Transport GHG Inventory for 2007, compiled by DoT, Wits Uni & Netgen (funded by British High Commission)

98. South Africa's CTF IP Phase 1 update (Phase 1B) recommends that the residual USD 57.5 million be reprioritised to support sustainable energy generation (SEG) or vehicle efficiency programmes (VEP) as described in paragraphs 100 and 101 below. The motivation for the recommendation hinges largely on the following two points:

- i. In view of the policy changes, institutional re-arrangements, programme momentum and political will, it is evident that government is committed to support the next three rounds of the successfully launched REIPPP. The DoE is currently in the process of establishing a debt fund that will reduce risks and encourage private sector participation to implement RE projects.
- ii. The pending adoption of the NATMAP by cabinet and the carbon tax proposal will increase the potential for government departments and sub-national governments – particularly public transport vehicles – to reduce GHG emissions through converting existing engine to dual fuel technology engines (mix of conventional and CNG) and related infrastructure.

Table 18: Summary of CTF commitments by lender/ by sub-component (USD million)

Lenders		CTF allocation (Planned)	CTF commitment (Actual)	Balance (per lender)	Commitment (per sub-component)
CTF – SEAT	IFC	42.5	42.0 (100%)	0	50%
	AfDB	42.5	0	42.5 (100%)	
CTF – EE	IFC	7.5	2.3 (31%)	5.2 (69%)	15%
	AfDB	7.5	0	7.5 (100%)	
CTF – SWH	IFC	25.0	0	25 (100%)	0%
	AfDB	25.0	0	25 (100%)	
TOTAL		150.0	44.3 (30%)	105.7 (70%)	30%

99. As the country enters its third decade of democracy after elections in April 2014, the pressure to implement projects that promote growth, employment and GHG reductions has surged. The critical success factors will be to respond quickly and flexibly to support programmes that have developed traction, address climate change and respond to government's socio economic challenges. Thus the proposed programmes for Phase 1B are based both on meeting demand and on up-scaling implementation of projects which rapidly meet the readiness criteria, with a commitment to support other follow-up projects in a potential Phase 2. The proposed Phase 1B (Phase 1 update) includes supporting the most feasible and mature projects described below:

100. ***The Sustainable Energy Generation Programmes (SEG), USD 57.5 million:*** Given the successful launch of the REIPPP programme, it is proposed that the CTF further supports the capital-intensive CSP projects and small scale IPP. In addition,

the Department of Energy plans to launch further phases for small-scale RE projects. Developers of such projects are likely to face hurdles in terms of project preparation support, equity and debt investment - as the commercial banks will not support small transactions. Preliminary discussions with one of the South African DFIs indicated that even though the DFI has expressed its commitment to the program, they are unable to provide 100% of the project funding requirements. There is therefore an opportunity to explore the possibility of supporting the creation of a facility that could provide debt financing to SEG projects, which are expected to form a significant number of the proposals in the next phase of the REIPPPP.

101. ***The Vehicle Efficiency Programme (VEP, fuel switching - Total Cost USD 375 million; CTF USD 57.5 million; AfDB USD 257 million; Government USD 60.5 million)***. The VEP aims to utilise the unallocated CTF funds to finance cleaner technology transformation programmes - primarily the conversion of existing engine to dual fuel technology engines (mix of conventional and CNG) and related infrastructure. The programme is part of the sector's commitment and contribution towards the national climate change response strategy. In addition, complementary assistance to DoT with the support of SANEDI will be provided and will comprise policy development, technical assistance and institutionalization of the climate change principles within DoT. This revised plan highlights the scope of these proposed projects. A sequel to Phase 1B (i.e. Phase 2) is anticipated, expanding the project footprint across the national public transport network, based on the replicability and scalability attributes of VEP. The overall programme aimed at transforming the transport sector from 'business as usual' practices towards making climate change and low-carbon economy central to its investment is referred to as the Technological Transformation Programme on Sustainable Transport for South Africa (TTP-STSA).

Phase 1B – Sustainable Energy Programme (SE)

102. South Africa's significant renewable energy targets along with a mix of market developments, such as Basel III related constraints, is expected to result in gradual increases in the cost of long-term debt. Financial institutions could also be less receptive to newer technologies such as CSP. Simultaneously, the barriers are also challenging for small-scale RE investors which in general do not meet the minimum investment size requirement of the commercial banks. .

Rationale for CTF Financing

103. In the utility-scale projects segment, the CTF financing would be used to reduce the high capital cost of CSP projects under the REIPPP and bring down the tariff for sustainable energy generation projects with private offtakes, thereby contributing to their bankability. In the context of small-scale projects, the developers of such projects are likely to face hurdles in terms of project preparation support, equity and debt investment as the commercial banks will not support small transactions. As per preliminary discussions with one of the South African DFIs there

is an opportunity to possibly have a targeted facility that could provide debt financing to photovoltaic projects, which are expected to form a significant number of the proposals. Emissions savings from investments in large and small sustainable energy plants over a projected 20-year plant life will contribute towards achieving South Africa CO₂ reduction targets.

Demonstration potential:

104. The demonstration potential for the targeted areas has multiple facets. Firstly, support for CSP development in the ongoing procurement supports South Africa's intention to develop CSP with significant industrial linkages, and potentially supports interest in CSP in neighbouring countries such as Namibia. Secondly, the development of private off take agreements has significant demonstration potential given the large number of well-established energy intensive users. Finally, the replication potential of small RE facilities across southern Africa is immense. This will assist in providing grid solutions to increase supply security, and off-grid solutions particularly to remote businesses and communities.

Transformational Impact:

105. The transformational benefits of the REIPPPP include improving energy security as well as generating sustainable energy. The DOE indicates that the programme was specifically designed to promote the creation of a renewable energy industrialisation hub in the region and to increase employment and skills development that will contribute towards fostering growth of the green economy. To facilitate this, the programme has local content requirements to boost local manufacturing and support for SMMEs. Potential to develop off-grid rural systems in remote areas are possible, thus improving access to energy.

Implementation Readiness

106. The implementation of the first two phases of the REIPP Programme was highly successful. South Africa has the capacity and the experience to implement the remaining phases of the REIPP and other RE programmes. Launched in August 2011, successful bids were awarded before the end of 2011 (window 1) for contracting end of 2012 and in May 2012 (window 2) for contracting mid-2013. The private off take market is beginning to take shape both with fossil fuel based and renewable energy based power and CTF support could potentially contribute towards increasing the mix of renewables in this segment.

Financing Plan

107. The total indicative costs for the potential investment opportunities outlined above in excess of USD1 billion. For instance, the indicative cost for a 100 MW CSP project could be approximately USD 850 million. Hence, CTF financing is expected to leverage several times more financing from other resources such as MDBs and the private sector in South Africa through the REIPPPP programme.

Transport: Technological Transformation Programme on Sustainable Transport for South Africa (TTP-STSA)

108. There is economic rationale for South Africa's transport sector to adopt clean technology, to wean itself off its dependency on imported oil and to expand the use of natural gas. It is a net importer of fossil fuel and the road subsector consumes almost 90% of the fuel needs of the sector. Emissions factor of the transport sector is estimated to 53 Mt CO₂ (58 Mt CO₂-eq, 2007⁴¹) with, again the road transport being the largest contributor, producing 92.6% (48 Mt CO₂-eq) of CO₂ emissions.

109. The commercial and economic viability of switching from liquid fuel consumption to gas is driven partly by the net economic cost to the country and the discoveries of large (estimated >400tcf) natural gas reserves locally and in neighbouring Mozambique. Being the third largest emitter with 13%-15% contributions, there are additionalities to be gained from the transport sector in implementing established mitigating measures.

110. South Africa is a net exporter to the SADC region and the sub-continent and the road-based heavy freight trucking and logistics subsector is a significant player. It contributes 6%, out of total of 7% by land-based transport, to national GDP (2007), carries 87% (1373 million tons) of the total freight tonnage and covers 245 billion ton/km (2007 figures) per year. The adverse impact is excessive strain on the road infrastructure which the DoT is attempting to address by advocating road to rail modal shift of freight traffic. However, difficulties remain in overcoming the obstacles such as the capital intensiveness of a reliable railway system and the 'institutionalization' of the trucking and logistics sectors.

111. South Africa's road-based public transport system (buses and mini-bus/taxis) contributes about 12 Mt CO₂-eq annually to the national total. The trucking industry operates over 320,000 trucks, with annual vehicle km travelled (VKT) of 13,000 million km and over 5,200 million litres of fuel consumption annually. Accordingly, it contributes an average of 15.8 Mt CO₂ (28%) of the annual CO₂ emissions of the transport sector. In total 45-50% of emissions are attributed to these two categories and form the target for the project; this is a critical subsector to tackle if national emissions targets are to be met.

112. The concentrations of these emissions are in the major metropolitan areas. Some local governments and municipalities have begun developing their own green strategy programmes such as piloting the dual-fuel taxi conversion programme by Gauteng province (2011) and the green fleet of metro-buses by CoJ. In 2011 the eThekweni Municipality (Durban) commissioned its own GHG emission inventory which revealed that transport is the largest GHG emitter (37%). While government has made attempts, progress is very modest for the country's largest emitters. The CTF interventions is designed to support and accelerate the conversion of initially public transport, and create an attractive and enabling environment for the conversion of private vehicles.

113. While some local governments have carried out piloting programmes to demonstrate technical viability, as part of the sector's mandate to address GHG emissions, the VEP has not been scaled-up given funding limitations. Demonstrating bankability of that type of projects has been a challenge for municipalities and government agencies.

⁴¹ South African Transport GHG Inventory for 2007, compiled by DoT, Wits University & Netgen (funded by British High Commission).

Vehicle Efficiency (fuel switching) Programme

114. The project involves the conversion of vehicles from conventional liquid fuels system to alternative and clean fuel, deployed on public transport vehicle (buses and taxi) fleets and government fleets. The project will convert buses, taxis and trucks from mono gasoline and diesel fuel systems to a dual fuel system (liquid fuel/CNG) with expected CO₂ emissions reduction of 50-60% per unit depending on vehicle category or type. The project is expected to convert a total of 38,000 units comprising 19000 minibus taxis; 9500 buses; and 9500 trucks; to dual-fuel engines across selected metropolitan and municipalities over a 20 year period.

115. The technology is well established and being implemented in some of CTF-financed activities in Latin America. The project will leverage the initiatives of DoT and City of Johannesburg (CoJ), elevating the programme to a national level rollout.

Proposed Programme

Period	Activity description	Responsible Agency
Years 1-2	To procure and refit, through a tender process 2000 taxis, 1000 busses and 1000 trucks with dual fuel technology which will use CNG/Biogas and diesel/petrol. .	DoT; Municipalities; SANEDI.
Annually, Years 3-20,	To procure and refit, through a tender process 1000 taxis, 500 busses and 500 trucks annually with dual fuel technology to use CNG/Biogas and diesel/petrol. Procurement and implementation of related infrastructure.	DoT; Municipalities; SANEDI.
Complementary Technical Assistance	Providing technical support services such as programme management services and implementing capacity building/training programmes. Project monitoring.	DoT; Municipalities; SANEDI.

Demonstration Potential

116. The additionality and rationale for a CTF intervention is to elevate and meaningfully implement an integrated and transformational programme that encompasses nationwide vehicle fleet conversion. The project will provide:

- i. Support developing a programme of sufficient critical mass to illustrate the emission and costs benefits of implementing the dual fuel technology;
- ii. Concessional funding that will assist in developing a sustainable nationwide investment programme in VEPs, that will facilitate private investment and participation;

- iii. Provide a market to develop gas infrastructure, given the South African government intention to diversify its energy sources including gas;
- iv. Foster investment in related infrastructure that will have positive impacts on reducing emission levels further;
- v. Create a viable market that will support the generation of gas from municipal waste (solid and liquid), which will contribute further to reducing emissions.

Transformational Potential

117. The project will involve significant private sector participation - service providers covering conversion and maintenance garages, fuelling and storage facilities and specialised training programmes as well as participation of major OEMs.

118. GHG reductions from the VEP are estimated at 732,000t CO₂ per year on completion.

Implementation

119. The project components include a vehicle retrofitting, installation/construction of fuelling facilities, storage facilities, NG pipe network, operational framework development, data collection and monitoring, training (by OEMs), capacity enhancement and monitoring.

120. The programme will be implemented, over a 20 year period, primarily in municipalities that have established some BRT systems or are in the process of doing so. Starting with the metropolitan municipalities in Gauteng, the programme will expand to other large cities in other provinces such as Gauteng, Western Cape, Eastern Cape and KwaZulu-Natal provinces where projects are being planned for implementation. It will be implemented in phases and will commence with the public transport system and later expanded to the trucking industry. In addition to the public sector, the technology will be extended to the freight and logistics subsector, which is the second largest contributor of the total transport sector emissions. It is assumed and expected that the extension to the trucking subsector will lag behind the public transport programme to allow for the consultation process and studies to be completed as this is an added initiative to the existing scope of government (DoT).

121. Some consultation with transport operators had been initiated to access to develop business case on routes operating the public transport systems. In setting up the programme, DoT, CoJ and SANEDI have engaged the private sector community and the business case is based on the inclusiveness of the private sector for service delivering through the operations of conversion garages, fuel facilities and conducting job training by specialist vehicle manufacturers. It is also anticipated that some financial support to be provided to SME to cover start-up cost and estimate of 800-1000 jobs could be generated in the supply and value chain per 10,000 units of vehicle conversion.

Financing Plan

122. An accurate cost estimate will be derived from further analysis and a detailed design exercise. However, historical data unit cost for the pilot project has been used, taking into account a 10% reduction for economies of scale: R16,000 per unit for taxi and R180,000 per unit for truck and buses. Excluding cost of the hard infrastructure, estimated cost is USD 375 million. Based on the balance from the phase 1 window, estimated as between USD 50 million and USD 100 million, the financing plan assumes a minimum allocation of USD 57.5 million to Phase 1B VEP.

123. Based on this Phase 1B pilot, the demand for the VEP programme is likely to increase significantly. An aggregated total on all fleets comprising buses, taxis and trucks to be converted under the program is estimated as 4000 during the first two years of the project (a critical learning period for the project) and 38,000 units for the full programme over a 20 year period.

The tentative financing plan for Phase 1B is shown in Table 19 below:

Table 179: Tentative Financing Plan (USD million) Phase 1B

Financing source	TTP-STSA		
	Component I (VEP)	Component II (BRT)	Total
CTF executed by AfDB	57.50	TBD	57.50
ADB Loans	257		257
GoSA (including provincial government)	60.50		60.50
TOTAL	375.00		375.00

ANNEXURES

Annex 1 Bibliography

Annex 1. 1: Relevant legislation and policy documents

White Paper on National Transport Policy	1996
UN Framework Convention on Climate Change (UNFCCC)	1997
Moving South Africa Strategy	1998
National Environmental Management Act (Act No. 107 of 1998)	1998
White Paper on Energy Policy	1998
National Land Transport Transition Act (NLTTA)	2000
Kyoto Protocol	2004
National Climate Change Response Strategy	2004
National Energy Regulator Act	2004
White paper on Renewable Energy	2005
National Land Transport Strategic Framework (NLTSF)	2006
Public Transport Action Plan: Phase 1 (2007-2010) Catalytic Integrated Rapid Public Transport Network Projects (DoT)	2007
Public Transport Strategy	2007
Public Transport Strategy and the Public Transport Strategy Action Plan	2007
Electricity Supply Act	2008
National Energy Bill	2008
The Long Term Mitigation Scenarios (LTMS)	2008
National Energy Efficiency Strategy (2005, reviewed 2008)	2009
National Energy Efficiency Strategy (2009)	2009
National Land Transport Act	2009
Sustainable Public Transport and Sport: A 2010 opportunity (PIMS 3276/ Project ID 55675)	2009
Energy Efficiency Demand Side Management (“EEDSM”) plan (NERSA)	2010
Guideline on environmental impact assessments for facilities to be included in the electricity response plan (Notice 162 of 2010)	2010
Integrated Resource Plan (IRP) for electricity 2010-2030	2010
Integrated Resource Plan (IRP2): 2010-2030 (2010)	2010
National Climate Change Response White Paper	2011
The Industrial Policy Action Plan (2011-13) (IPAP 2)	2011
The New Growth Path Framework (NGP)	2011
Gauteng Department of Roads and Transport (GDRT) 25-year Integrated Transport Master Plan & 5-Year Transport Implementation Plan	2012
National Infrastructure Plan (NIP)	2012
The Industrial Policy Action Plan (2012-15)	2012
Carbon Tax Policy Paper 2013	2013
Electricity Regulation Amendment (ERA) Act	2013
Electricity Regulation Second Amendment Bill	2013
Independent System and Market Operator (ISMO) Bill	2013
National Development Plan Vision 2030	2013

National Energy Regulator Amendment (NERA) Bill	2013
National Environment Management Laws Act 2013	2013
National Environmental Management Laws Act (Act No. 14 of 2013)	2013
Strategic Integrated Transport Plan (ITP) Framework for the City of Johannesburg (draft)	2013
The Industrial Policy Action Plan (2013-16)	2013
Towards a New Power Plan (NPC)	2013

Annex 1.2: Bibliography

Abengoa completes tower construction of 1 st CSP in SA (Reuters)	2013
CIF website	2013
CTF Revised investment plan for South Africa	2009
Energy efficient housing in South Africa (report)	2002
Eskom renewables (presentation to funders)	2012
Greenhouse gas inventory South Africa (1990-2000)	2009
IFC Partners With the Government of South Africa on Universal Electrification Strategy (IFC press release)	2012
IFC websites	2013
Integrated National Electrification Programme (INEP)- Presentation DoE	2013
PAD on a proposed loan for the CTF to Eskom Renewables Support Project (World bank)	2011
Kaxu Solar One: Executive Summary Construction Progress	2013
Khi Solar One: Executive Summary Construction Progress	2013
PID RSA CTF Joint IFC-AfDB Energy Efficiency Programme proposal	2010
The role of Bus Rapid Transit in improving public transport for the urban poor users (UCT Masters Thesis)	2011
CoJ – BRT/IPTN Workshop	2013
Lurch towards Formalization – Lessons from the Implementation of the BRT in Johannesburg	2012
UNEP – Emissions Gap report	2012
Integrated development Plan – CoJ 2012/16	2012
Funding projects in REIPP – Lessons learned from BD1 – Standard Bank	2012
Business Case – Bus Rapid Transit Strategy for London	2013
Energy and Environmental Impacts of BRT in APEC Economies – Breakthrough Technologies Institute	2011
Estimating Greenhouse Gas Emissions associated with achieving Universal Access to Electricity in South Africa – ERC (UCT)	2012
SARI – Presentation to Energy Portfolio Committee	2012
CoJ Mayoral Committee – Green Transport Roadmap	2013
Economics of Natural Gas Vehicles – Southern Africa (Prime Africa)	2010
Green Fuels Proposal – Johannesburg (Basel)	2013
Sustainable Transport – The Case of Rea Vaya Johannesburg	2010
IDC Gas Vehicle Pilot Transport Fleet Trial	2013

Department of Transport Budget Speech	2013
PID RSA CTF Joint IFC-AfDB Sustainable Energy generation Programme proposal	2010
PID RSA CTF Joint IFC-AfDB SWH Programme proposal	2010
Powering the future: Renewable Energy roll-out in South Africa (Greenpeace)	2013
Recent developments in the reform of land passenger transport Volume 39, Issue 1, THREDBO 12	2013
South Africa Electricity Supply Conference (Key note)	2013
South Africa's rapid electrification programme: Policy, institutional, planning, financing and technical innovations (Energy policy 36)	2008
State of SA Economic Infrastructure Report	2012
Sustainable Public transport and sport : a 2010 opportunity (PIMS 3276/ Project ID 55675)	2009
Towards 2020: Public transport strategy and action plan (26th SATC conference)	2007
Who's winning the Clean Energy Race? (PEW Charitable Trust)	2013
SAWEA website	2013
Fossil Fuel Foundation website	2013
CTF Investment plan (October 2009)	2009
Revised CTF Investment plan (November 2009)	2009
Agendas imperil Mighty Eskom (C. Hazard, Cape times, 18/09/2013)	2013
Renewable energy won't cut it (C. Hazard, Cape times, 19/09/2013)	2013
Nuclear power does not create Jobs (B. Martin, Cape times, 19/09/2013)	2013
Press release IFC/SA Universal Electrification strategy (24/10/2012)	2012