Clean Development Mechanism South Africa
Designated National Authority

energy
Department:
Energy
REPUBLIC OF SOUTH AFRICA

Private Bag X 19 , Acardia ,Pretoria, 0007, Tel:012-444 4116, Fax: 012 444 4501
Private Bag X9111, Cape Town, 8000, Tel: 021-469 6412, Fax: 021-465 5980

Project Design Document (PDD)

Project reference number (office	
Date received (office use only)	

NOTES ON COMPLETING THIS PROJECT DESIGN DOCUMENT

1. Please provide this PDD in both hard-copy

Part A: Project Proponent Details

Project Name	ETA Energy Solar Water Heater Programme in South Africa
Date of Submission of PDD	4 January 2012

Project Developer	
Name	ETA Energy (Pty) Ltd (formerly CEF Sustainability Pty Ltd)
Organizational Category	Government Agency
Legal Status	Privately held company
Street Address	152 Ann Crescent, CEF House Block C, Upper Grayston Office Park Strathavon, Sandton
Postal Address (if different from above)	P.O Box 786141 Sandton 2146
Website Address	www.cefgroup.co.za

Main Activities	ETA Energy is wholly owned subsidiary of CEF Group focused on alternative energy project identification and development. Their projects are in the areas of renewable energy, energy efficiency as well as manufacturing.
Summary of Financial Performance in last fiscal year	
Contact Person(s)	Mr. Jabulani Shabalala
Telephone	Work: 010 201 4700
Fax	
Email Address	jabulanis@cefgroup.co.za
Project Partners Provide the following Information for **all** project partners (copy and paste relevant sections of the table if information is to be provided on more than one partner organisation)	
Name	CEF Carbon
Nature of partner	CDM Project development and management
Organizational Category	Government Agency
Legal Status (if private company)	limited company
Street Address	152 Ann Crescent, CEF House Block C, Upper Grayston Office Park Strathavon, Sandton
Postal Address (if different to Street Address)	P.O Box 786141 Sandton 2146
Website Address	www.cefgroup.co.za
Main Activities	CEF Carbon is a CDM developer providing services within three main areas: • Advisory – strategy & master planning, regulatory design, and capacity building • Financial – carbon financing, brokerage and carbon trading • Operational – CDM project management, project development, project validation, and registration.
Contact Person(s)	Ms. Nicole Algio
Telephone	Work: +27 01 201 4700
Fax	
Email Address	nicolea@cefgroup.co.za
Project Partners Provide the following Information for **all** project partners (copy and paste relevant sections of the table if information	

is to be provided on more than one partner organisation)	
Name	GreenStream Networks GmbH
Nature of partner	PDD Developer
Organizational Category	Private company
Legal Status (if private company)	limited company
Street Address	Stralauer Platz 33/34 10243 Berlin Germany
Postal Address (if different to Street Address)	Stralauer Platz 33/34 10243 Berlin Germany
Website Address	www.greenstream.net
Main Activities	GreenStream Networks is a leading Nordic climate change services organization offering services in green investment vehicles, market analysis, CDM, Asset management.
Contact Person(s)	Mr. Jurgen Wiesmann
Telephone	Work: +49 151 1248 4459
Fax	
Email Address	Jurgen.Wiesmann@greenstream.net
Contractual Arrangements	
Contractual arrangements between various entities involved	ETA Energy is the project owner. CEF Carbon and GreenStream Networks are the CDM project developers. ERPAs have been concluded with buyers for the CERs, namely: • Ministry of Foreign Affairs of Finland • Nordic carbon Fund Ky • Fine Carbon Fund Ky • Climate opportunity Fund Ky

Part B: Project Overview (Technical Summary, Location and Schedule)

Technical Summary of the project	
Objective of the Project	The ETA Solar Water Heater Programme in South Africa (hereafter referred to as "the PoA") is a small-scale CDM programme of activities with the goal of increasing the use of solar water heaters (SWH) in residential and commercial applications throughout the Republic of South Africa. The PoA contributes to this goal by supplying and installing SWHs as well as by providing a comprehensive financing, warranty and maintenance package. The SWH installed under the PoA replace existing water heating systems (mostly electric geysers). The PoA therefore helps to reduce grid-based electricity and fossil fuel consumption and the resulting carbon emissions. The displaced electricity would have been sourced from the national power grid and transmitted over long distances from centralised power stations, which utilize a mix of primary energy sources that are predominantly fossil fuel-based. As a result, the PoA contributes towards a sustainable low carbon economy and the 10,000 GWh renewable energy target set by the government in November 2003.[1].

Project Description

The purpose of any CPA under the PoA is the installation of SWHs in residential or commercial applications in the Republic of South Africa. The installed SWHs replace existing water heating systems (predominantly electric geysers) that would otherwise have been used to produce hot water and that would otherwise have consumed grid-based electricity or fossil fuels. As a result, the CPAs reduce the consumption of grid-based electricity or fossil fuels as well as the related carbon emissions.

The PoA allows different SWH systems to be included in a CPA as long as they have successfully completed quality testing by the South African Bureau of Standards (SABS). All major components of the installed SWH systems are quality-tested in order to ensure that the installed SWHs are able to withstand local climatic and water quality conditions. All SWHs are installed by South African companies that have the necessary qualifications, experience and training for the installation of SWH.

SWH system may use different technologies, such as flat plate or evacuated tube collector technologies. Both direct and indirect SWH systems qualify for the inclusion into a CPA. In direct systems, the drinking water is heated directly by the solar panels. In indirect systems an anti-freeze fluid circulates in the solar collectors but is physically separated from the hot water circuit. The two systems are connected via a heat exchanger.

[1] The White Paper on Renewable Energy by the Department of Minerals and Energy was published in November 2003. It is available at: http://www.dme.gov.za/pdfs/energy/renewable/white_paper_renewable_energy.pdf

Technical Summary of the project	
Project Constraints **Customer-level Barriers:** The large-scale adoption of SWHs in South Africa is primarily prevented by the lack of financial resources for the purchase and installation of SWHs. The barrier is listed in paragraph 1 (d) of Attachment A to Appendix B as "Other Barrier: Financial Resources". Technological barriers and barriers due to prevailing practice aggravate the situation. **PoA-Level Barriers** Coordinated voluntary programmes, such as the proposed PoA need to provide substantial additional incentives to customers in order to provide an affordable SWH solution that overcomes the aforementioned barriers. As a result, the PoA offers participating customers a SWH financing scheme that makes the upfront investment costs of switching from an existing water heating system to a SWH unit manageable. The PoA offers customers the opportunity to pay the cost of their SWHs over a medium financing term (up to 72 months) with fixed instalments that are comparable to the the savings in their electricity bill.	
Technology to be employed	**Each direct system typically consists of:** 1. Solar panels; 2. Storage tank; 3. Equipment to protect against potential high pressure; 4. Piping and equipment to link collector and tank; 5. Solar collector array support/fixation structure; 6. Piping system for cold water supply and hot water supply to user; 7. Electrical backup (if the system is connected to an electrical supply); 8. Regulated circulation pumps (if the system is forced circulation). **Each indirect system typically consists of:** 1. Anti-freezing liquid; 2. Heat exchanger; 3. Solar panels; 4. Storage tank (existing or new); 5. Equipment to protect against potential high pressure; 6. Piping and equipment to link collector and tank; 7. Solar collector array support /fixation structure; 8. Piping system for cold water supply and hot water supply to user; 9. Electrical backup (if the system is connected to an electrical supply); 10. Regulated circulation pump (if the system is forced circulation). In countries where SWH systems have been installed, they have been shown to have effective operating lifetimes in excess of ten years.[2]
Greenhouse Gases Targeted	The primary GHG reduction will be from CO_2 as a consequence of the

[2] Solar Direct Website 2 May 2010: http://www.solardirect.com/swh/swh.htm

Technical Summary of the project	
	substitution of solar energy for electricity from coal as the primary energy source. The elimination of electricity transmission and distribution losses will provide further reductions in CO_2 emissions
Emission reductions	Annual emission reduction will depend on how many CPAs are registered. The first CPA is in NMBM and will constitute an emission reduction of up to 40,000 tonnes CO_2 equivalent
Baseline & Additionality Assessment	The baseline and additionality approach adopted for the project is based on the methodology. AMS I.J.
Monitoring	ETA is opting for a verification method that verifies each CPA separately, based on the monitoring plan in section B.6 of the the CPA-DD. ETA is implementing a system that will allow the DOE to verify the emission reductions for each individual CPA and to consolidate the CPAs to determine the emission reductions for the PoA as a whole. Each SWH is assigned exclusively to one single CPA, and the emission reductions can therefore be calculated for each CPA according to the available methods in AMS I.J, and no double-counting can occur. The monitoring periods for all CPAs are calendar years.
Type of project/activities	
a. Energy Supply	Renewable energy – the provision of hot water for domestic use in households where the water is heated from ambient temperature to the desired hot water temperature using solar energy incident on the collector of discrete solar water heating systems.
Project Boundary The project boundary is South Africa with the main and first CPA being in NMBM.	
Indicate Emissions outside the Project Boundary	Yet to be determined

Location of the Project	
Province	South Africa, but the first PoA is in the Eastern Cape Province
Municipality	South Africa with the first CPA in NMBM
Nearest city/large town	South Africa with the first CPA in Port Elizabeth
Brief description of the location of the project site	-

Project Schedule/Timetable	
Earliest Project Start Date	

Project Schedule/Timetable	
	24 February 2010 (PoA)
When is the expected first year of CER delivery	2012
Project Lifetime	28 years (PoA)
Project End Date	December 2038
Crediting Period	The project chose a crediting period of 10 years for each CPA
Current Status or phase of the project	CDM Validation
DNA Approval	No
Approval by other bodies	The Provincial Office of the Department of Environment Affairs and Tourism for the Eastern Cape has been consulted and no EIA is required for a SWH project.

Part C: Performance Against the DNA's Sustainable Development Criteria

South Africa has identified the following sustainable development criteria and indicators against which each CDM project will be assessed. Please provide your interpretation of how this project will address each of these **criteria and indicators** where they are relevant to the project. If the space provided is not sufficient please append additional information as required.

NOTE: For all indicators which are of relevance to the project show how the performance of the project against these indicators can be objectively monitored and measured on an ongoing basis.

1. Economic: Does the project contribute to national economic development?

Please give details (1 paragraph)

Yes. The project provides hot water service needs in a manner which stimulates decentralised local economic development in the Eastern Cape which in a manner which supports the national economy. Solar water heating systems are acknowledged to create and sustain more employment opportunities than the 'business-as-usual' approach of using electricity generated from centralised coal-fired power stations for use in storage water heaters.

The project supports the target for 10,000 GWh/annum of new renewable energy of the Department of Minerals and Energy.

2. Social: Does the project contribute to social development in South Africa?

Please give details (1 paragraph)

Yes. The project provides a more reliable and sustainable service of hot water for bathing and other household activities which secures better personal and public health for project participants and for the country as a whole.

3. Environmental: Does the project conform to the National Environmental Management Act principles of sustainable development? Please provide **brief** comment for each of these below. Yes. The project reduces the consumption of non-renewable natural resources - such as coal, uranium and oil – and water (for cooling). In addition, the project reduces the emission of airborne particulates (ash) and pollutant gases which cause air quality problems in the Mpumalanga, Limpopo and Gauteng Provinces.	
i) That the **disturbance of ecosystems and loss of biological diversity** are avoided, or where they cannot be avoided, are minimised and remedied	i) That the **disturbance of ecosystems and loss of biological diversity** are avoided, or where they cannot be avoided, are minimised and remedied
ii) That **pollution and degradation of the environment** are avoided, or where they cannot be altogether avoided, are minimised and remedied	ii) That **pollution and degradation of the environment** are avoided, or where they cannot be altogether avoided, are minimised and remedied
iii) That the **disturbance of landscapes and sites that constitute the nation's cultural heritage** is avoided, or where it cannot be altogether avoided, is minimised and remedied	iii) That the **disturbance of landscapes and sites that constitute the nation's cultural heritage** is avoided, or where it cannot be altogether avoided, is minimised and remedied
• That **waste is avoided**, or where it cannot be altogether avoided, minimised and reused or recycled where possible and otherwise disposed of in a responsible manner	• That **waste is avoided**, or where it cannot be altogether avoided, minimised and reused or recycled where possible and otherwise disposed of in a responsible manner
v) That **the use and exploitation of non-renewable resources is responsible and equitable**, and takes into account the consequences of the depletion of the resource	v) That **the use and exploitation of non-renewable resources is responsible and equitable**, and takes into account the consequences of the depletion of the resource
vi) That the **development, use and exploitation of renewable resources is responsible and equitable**, and takes into account the consequences of the depletion of the resource.	vi) That the **development, use and exploitation of renewable resources is responsible and equitable**, and takes into account the consequences of the depletion of the resource.
vii) That **a risk averse and cautious**	vii) That **a risk averse and cautious approach** is applied, which

approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions	takes into account the limits of current knowledge about the consequences of decisions and actions
vii) That **negative impacts on the environment and on people's environmental rights** be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied	vii) That **negative impacts on the environment and on people's environmental rights** be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied
Other comments **Please provide any other comments on how this project contributes to sustainable development in South Africa (**optional) The project provides a much needed social and economic benefit in terms of hot water services in a manner which maximizes employment opportunities and local economic development and which, furthermore, is more sustainable in the longer term in terms of dependencies on external factors and resources.	

Indicators in Support of the Project Approval Criteria			
Category		**Indicator**	**Comment**
Environmental	Impact on local environmental quality	• Impact of the project on air quality • Impact of the project on water pollution • Impact of the project on the generation or disposal of solid waste • Any other positive or negative environmental impacts of the project (such as impacts on noise, safety, visual impacts, or traffic)	Please comment on the impact of the project on local environmental quality. Comment specifically on the indicators of relevance which are given here. (1 paragraph) The air quality, water pollution and solid waste impacts of providing hot water services from locally-installed solar water heating systems will be a significant improvement over the current 'business-as-usual' approach of (predominantly) coal and nuclear powered centralised power stations located over 1200 km away.
	Change in usage of natural resources	• Impact of the project on community access to natural resources • Impact of the project on the sustainability of use of water, minerals or other non renewable natural resources • Impact of the project on the efficiency of resource utilisation	Please comment on the impact of the project on the usage of natural resources. Comment specifically on the indicators of relevance which are given here. (1 paragraph) The project will utilise renewable energy and free up water and reserves of non-renewable resources such as coal and uranium which are currently depleted in the 'business-as-usual' approach to hot water service provision.
	Impacts on biodiversity and ecosystems	• Changes in local or regional biodiversity arising from the project	Please comment on the impact of the project on biodiversity and ecosystems. Comment specifically on the indicators of relevance which are given here. (1 paragraph) The project will not affect local or regional biodiversity in a negative manner. It is likely to have positive impacts overall on biodiversity and ecosystems in the regions where the coal and uranium are mined and converted into electricity.

Indicators in Support of the Project Approval Criteria		
Category	**Indicator**	**Comment**

Indicators in Support of the Project Approval Criteria			
Category		**Indicator**	**Comment**
Economic	Economic impacts	• Impact of the project on foreign exchange requirements • Impact of the project on existing economic activity in the area • Impact of the project on the cost of energy • Impact of the project on foreign direct investment	Please comment on the economic impacts of the project. Comment specifically on the indicators of relevance which are given here. (1 paragraph) The project will have positive local (NMBM), regional and national economic impacts. These include improved public health, local employment, economic stability
	Appropriate technology transfer	• Positive or negative implications for the transfer of technology to South Africa arising from the project • Impacts of the project on local skills development • Demonstration and replication potential of the project	Please comment on the impacts of the project on appropriate technology transfer. Comment specifically on the indicators of relevance which are given here. (1 paragraph) The project specifically addresses these dimensions of appropriate technology transfer in a conscious and focused manner.

Indicators in Support of the Project Approval Criteria			
Category		**Indicator**	**Comment**
Social	Alignment with national provincial and local development priorities	• How the project is aligned with provincial and national government objectives • How the project is aligned with local developmental objectives • Impact of the project on the provision of, or access to, basic services to the area • Impact of the project on the relocation of communities if applicable • Contribution of the project to a any specific sectoral objectives (for example, renewable energy targets)	The project complies with the South African Government's objectives for: • Promotion of CDM. • Improvement of environmental quality. • Reduction on reliance of fossil fuels. • Enhancing economic development and job creation. • Green house gas reduction No community will be relocated due to the project activity. The project aligns with municipality development plan that improves energy efficiency.
	Social equity and poverty alleviation	• Impact of the project on employment levels? (specify the number of jobs created/lost; the duration of time employed, distribution of employment opportunities, types of employment, categories of employment changes in terms of skill levels and gender and racial equity) • Impact of the project on community social structures • Impact of the project on social heritage • Impact of the project on the provision of social amenities to the community in which the project is situated • Contribution of the project to the development of previously underdeveloped areas or specially designated development nodes	

Indicators in Support of the Project Approval Criteria			
Category		**Indicator**	**Comment**
General	General Project Acceptability	• Are the distribution of project benefits deemed to be reasonable and fair?	The project will benefit the municipality through the provision of electricity from renewable sources and the creation of new jobs. At the municipal level the 10% saving on electricity target that has been set out by Eskom will be reached. At the community level, after the initial capital cost payback of the SWH, the customer will have a saving on the electricity bill. At the national level of course there will be benefits in terms of reduced emissions at the sites where power is generated and some relief for the national grid. The benefits of the project are deemed to be reasonable and fair in that no one group is experiencing negative impacts in order for someone else to benefit.

Part D: Finance

Project Costs	
Development Costs (R's)	R10 million
Installed Costs (R's)	R980 million
Other Costs (R's)	R20 million
Total Project Costs (R's)	R1,1 billion
Sources of Finance	
Equity	*ETA Energy (SOC) ltd*
Debt (long term)	To be established
Debt (short term)	To be established Initial development costs are funded by ETA Energy (SOC) Ltd. and CEF (SOC) Ltd.
Amount not identified (R's)	None
Total CDM Contribution sought	It is expected: ZAR 10,000 000.00 and 14,000,000.00 per annum once the project is fully operational
Expected Price of CER in case of a contract to purchase for: A period of 7 years A period of 10 years A period of 14 years (2x7 years)	It is expected that CERs will be sold at a minimum of ZAR 70-100 per tonne.
Indicate the **projected Internal Rate of Return** for the project with and without CER revenues.	IRR = 8-10% (depending on current financial parameters)
Constraints on tradability of carbon credits	No
Preliminary discussions with potential purchasers	ERPA is in place.
Project Costs	
Development Costs (R's)	
Installed Costs (R's)	R60,015,000 (incl. equipment cost)
Other Costs (R's)	R6,002,000
Total Project Costs (R's)	R66,016,000

Sources of Finance	
Equity	R19,805,000
Debt (long term)	70/30 Debt/equity ratio based on Installed Costs R46,211,000 debt
Debt (short term)	
Amount not identified (R's)	None.
Total CDM Contribution sought	ZAR 100 million (€9 million)
Expected Price of CER in case of a contract to purchase for: A period of 7 years A period of 10 years A period of 14 years (2x7 years)	ERPAS have been concluded with buyers for the sale of CERs over a period of 10 years.
Indicate the **projected Internal Rate of Return** for the project with and without CER revenues.	IRR: 10% -20%
Constraints on tradability of carbon credits	None
Preliminary discussions with potential purchasers	ERPAs have been concluded with buyers for the CERs, namely: • Ministry of Foreign Affairs of Finland • Nordic carbon Fund Ky • Fine Carbon Fund Ky • Climate opportunity Fund Ky