SPWA-CC: Promoting Renewable Energy Based Mini-Grids for Rural Electrification and Productive Uses in Chad

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Independent GEF Terminal Evaluation

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Vienna, 2016

This report has been prepared for UNIDO for the Terminal Evaluation of the UNIDO GEF Project "SPWA-CC: Promoting Renewable Energy Based Mini-Grids for Rural Electrification and Productive Uses in Chad"

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Abbreviations and acronyms

ADER	Agence Developpement Energie Renouvable (Agency of Renewable Energy Development)
CO_2	Carbon Dioxide
ECOWAS	Economic Commission of West African States
ECREEE	ECOWAS Centre for Renewable Energy and Energy Efficiency
EA	Executing Agency
EE	Energy Efficiency
ENE	Energy Branch
ERP	Enterprise Resource Planning System
ET	Evaluation Team
EVA	UNIDO Office for Independent Evaluation
EU	European Union
FP	Focal Point
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gases
GoC	Government of Chad
IA	Implementing Agency
IEE	Industrial Energy Efficiency
kW	Kilowatt
kWh	Kilowatt hour
MBO	Management by Objectives
M&E	Monitoring and Evaluation
MOE	Ministry of Oil and Energy
MPE	Ministry of Petrol and Energy
MoU	Memorandum of Understanding
MTR	Mid-Term Review
MWh	Megawatt hour
NGO	Non-Governmental Organization
ODG/EVA	Office of the Director General / UNIDO Office for

	Independent Evaluation
PC	Project Component
PD	Project Document
PIF	Project Identification Form
PIR	Project Implementation Report
PMIS	GEF Project Management Information System
PCU	Project Coordination Unit
PPA	Power Purchasing Agreement
PPG	Project Preparation Grant
PPP	Private Public Partnership
PSC	Project Steering Committee
PV	Photovoltaic Technology
QA	Quality Assurance
QAE	Quality at Entry
RCE	Request for CEO Endorsement
RBM	Results Based Management
RE	Renewable Energy
RRE	Renewable and Rural Energy Unit
SME	Small and medium Enterprises
SPWA	Strategic Programme for West Africa
STAP	Scientific and Technical Advisory Panel of the Global Environment Facility
TA	Technical Assistance
TE	Terminal Evaluation
TOC	Theory of Change
ToR	Terms of Reference
TTA	Tramatecno Ambiental
UNDAF	United Nations Development Assistance Framework
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
UNDP	United Nations Development Programme

Glossary of evaluation-related terms

Term	Definition
Baseline	The situation, prior to an intervention, against which progress can be assessed.
Effect	Intended or unintended change due directly or indirectly to an intervention.
Effectiveness	The extent to which the development intervention's objectives were achieved, or are expected to be achieved.
Efficiency	A measure of how economically resources/ inputs (funds, expertise, time, etc.) are converted to results.
Impact	Positive and negative, intended and non-intended, directly and indirectly, long term effects produced by a development intervention.
Indicator	Quantitative or qualitative factors that provide a means to measure the changes caused by an intervention.
Intervention	An external action to assist a national effort to achieve specific development goals.
Lessons learned	Generalizations based on evaluation experiences that abstract from the specific circumstances to broader situations.
Logframe (logical framework approach)	Management tool used to facilitate the planning, implementation and evaluation of an intervention. It involves identifying strategic elements (activities, outputs, outcome, and impact) and their causal relationships, indicators, and assumptions that may affect success or failure. Based on RBM (results based management) principles.
Outcomes	The likely or achieved (short-term and/or medium/term) effects of an intervention's outputs.
Outputs	The products, capital goods and services which result from an intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes.
Relevance	The extent to which the objectives of an intervention are consistent with the beneficiaries' requirements, country needs global priorities and partner's and donor's policies.
Risks	Factors, normally outside the scope of an intervention, which may affect the achievement of an intervention's objectives.
Sustainability	The continuation of benefits from an intervention, after the development assistance has been completed
Target groups	The specific individuals or organizations for whose benefit an intervention is undertaken.

Executive summary

This report presents the findings of the Terminal Evaluation (TE) of the project "SPWA-CC: Promoting Renewable Energy Based Mini-Grids for Rural Electrification and Productive Uses in Chad" (herein referred to as "Project"), implemented by the United Nations Industrial Development Organization (UNIDO) with financing grant provided by the Global Environment Facility (GEF).

An evaluation team of two experts, international evaluation consultant Ms. Iva Bernhardt, and national evaluation consultant Mr. Djibrine Ngarmig-Nig conducted the Terminal Evaluation in the period of September 2015 to November 2015. The evaluation included interviews at UNIDO HQ in Vienna and in Chad. The evaluation field mission included visits of the national evaluation expert to the three demonstration project sites at Mombou, Douguia and Guelendeng.

The overall project objective is to reduce GHG (Green House Gases) Emissions through promotion of renewable energy bases rural mini-grids for productive uses and energy access in Chad.

The objective of the TE is to assess to what extent did the project achieve the expected results at the time of the terminal evaluation, i.e. to what extent the project has promoted renewable energy (solar) based mini-grids in rural areas of Chad for productive uses and energy access and thereby avoid GHG emissions.

The evaluation covers the period from June 2012 to the end of the project October 2015. The project has ended end of October 2015.

The overall objective of the project was to avoid greenhouse gas emissions by promoting renewable energy technologies for mini-grid rural electrification for productive uses in Chad.

The project: "Promoting renewable energy based mini-grids for rural electrification and productive uses in Chad" was expected to remove the institutional, technical, knowledge and awareness-related barriers to the promotion of a market approach for the development of mini-grid connected renewable energy systems to meet the growing need for access to electricity in rural areas, which is currently met or likely to be met by fossil fuels. This was to be done mainly through (i) creating a critical mass of skilled and knowledgeable technicians and public officers; (ii) pilot projects, building awareness about the appropriate technologies and the best practices; (iii) linking energy services with productive uses, and (iv) putting in place policies encouraging the involvement of the private sector and providing access to innovative and smart financial mechanisms.

The project aimed to establish around 5 pilot sites (mainly Photovoltaic (PV), but also waste-to-energy or mini hydro, etc.) in off-grid isolated communities on a market-oriented public-private partnership approach. Pilot sites were selected on the basis of their potential to use the generated energy for productive uses that will generate income.

Key findings

Design. The project design is rated as **MODERATELY UNSATISFACTORY**, whereas the project design is relevant, however the baseline was not correct in the original Project Document. The Project Results Framework with its outcomes and outputs, as well as target indicators were not developed adequately (having the measurable element of being a SMART indicator) and they did not allow for proper adaptive management and monitoring of project results. Therefore, at time of the mid-term review, amendments to design have been carried out to be in line with country needs and resources available, taken into account the situation with the co-finance, and be more realistic of what is feasible to be implemented for the given period of time with the given amount of finances.

Effectiveness. Project effectiveness at time of the Terminal Evaluation is rated as **SATISFACTORY** in the light of overall satisfactory project finalisation and implementation, and the tangible results of delivered planned activities/inputs and reaching of the main project objectives versus lack of co-financing.

Overall, the project has been effective, with the main outputs planned being achieved by the time of the Terminal Evaluation: detailed feasibility studies for mini solar grids have been prepared for five sites and diverse technical trainings have been delivered to 109 stakeholders on renewable energy, and technical maintenance, three solar photovoltaic stations have been constructed with a total capacity of 121.7 kWc and 213 connections. Yet, some outputs from the institutional, political and financial mechanisms have not been delivered, as the institutional framework to allow private sector operation is still not in place, and the draft document on Electrification Policy and Law on Renewable Energy exist, however they have not yet been amended and passed by the Government. On the other hand, ADER (Chadian Renewable Energy Development Agency) is being created.

Relevance. Based on the assessment of full project relevance to local and national energy priorities, policies and strategy of the Government of the Chad, to GEF's strategic priorities and objectives, and to the GEF focal area of climate change and SP3 - Promoting market approaches to renewable energy, and to UNIDO's mandate, overall project relevance is considered to be **HIGHLY SATISFACTORY**.

Efficiency. The project efficiency was rated as **MODERATELY SATISFACTORY**, as efforts were undertaken to ensure cost-effectiveness, and therewith efficiency of results delivered during project implementation. The final tranche of co-finance promised and committed by the government has not been delivered, which caused that the project did not reach the overall impact as planned in the original project document by constructing only three instead of the five planned demonstration sites. Materialized co-financing by the Government amounted to 771,000 USD (cash and in-kind) instead of the planned 1.636 mill. USD in the original Project Document. Activities with some of the trainings and the three demonstration projects were behind schedule, but fully completed for the three sites in June 2015.

Sustainability. The sustainability of this project is rated as **MODERATELY UNLIKELY.** The reason behind is that there are significant financial risks to sustainability associated with the sustainability at each demonstration site with the fact that if the revenues are unable to cover the costs of management and future equipment replacement, the sustainability becomes questionable. Secondly, the lack of co-finance limited the number of sites to three instead of five as planned originally in the Project Document, and three sites may not be profitable enough for a private sector operator to take on the maintenance. Furthermore, there is a strong oil lobby in the country which affects the allocation of finance and could reduce/divert money from renewable energy, and there are some minor technical risks related to problems at demonstration sites (such as the stability of the underground cables) that affect the revenues and ability to convince government to commit resources. Furthermore, there are moderate risks at the time being that affect socio-political sustainability, which might continue affecting the sustainability of the project in the future after project completion (insufficient public stakeholders awareness of RE), there are significant risks that affect institutional framework and governance sustainability as institutional framework to allow private sector operation is still not in place (even though a Draft Document on Electrification Policy and Law on Renewable Energy exists, it has not been amended and passed by the Government), and there are no identified potential risks to environmental sustainability.

M&E. The implementation of M&E and use for adaptive management is rated **MODERATELY SATISFACTORY,** with the project having a functioning M&E system but was not systematic and the results framework was not used. No indicators were included for more detailed outputs or outcomes in the updated M&E Plan. It was not clear how frequently it was up-dated nor how it informs further work or management. Annual reporting on PIR correctly carried out at outcome level. Each demonstration site included monitoring of kWh (and so the GHG avoided were able to be measured).

Project management has been successfully carried out by the UNIDO Project Managers, taken into consideration that three Project Managers have changed during project implementation and Project Management Unit (PMU) led by the National Project Coordinator (NPC) in the Chad. The lack of availability of local co-ordination at times has resulted in more time from management in Vienna HQ (adding an extra step in overall management) which implies a lack of efficiency. The rating for Project Coordination and Management is **SATISFACTORY**.

Key Conclusions

The project received an overall Satisfactory rating of the project results from the fact that Project Relevance was highly satisfactory as Renewable Energy is one of the priorities of the Chadian Government, and the good project implementation taking into consideration the extreme difficulties in working with conditions under low security level, lack of government co-financing, issues with staff on the ground and less developed business environment, where private sector in the Renewable Energies field is at its dawning. The project management has displayed flexibility by re-designing the project where, at the time of the mid-term review, project modifications and amendments have made the project more coherent with achieving overall satisfactory results.

The viability of a proposed renewable energy enterprise model depends on the sufficient number of renewable energy mini-grids able to assure a sustainable investment strategy in order to enable the private sector to exploit these systems. Without a clear government engagement and support of multiplication of these Renewable Energy systems, the long-term viability and sustainability of this project is limited.

The project has avoided 1590 tCO2 of Green House Gases emissions and increased electricity access in Chad of 219 new grid connections and as the same were corrected during the Mid-Term Review due to the lack of the co-financing by construction only three sites out of the five planned with a total capacity of 112 KW installed.

Project ratings

Based on the evaluation, the evaluation team has rated the Project with an overall rating of Highly Satisfactory (HS). The summary evaluation of the Project is given in the table below.

Table 1 Summary of project rating and overall ratings table

Criterion	Evaluator's Rating
Attainment of project objectives and results (overall rating) Sub criteria (below)	**S**
Design	**MU**
Effectiveness	**S**
Relevance	**HS**
Efficiency	**MS**
Sustainability of Project outcomes (overall rating) Sub criteria (below)	**MU**
Financial risks	**MU**
Sociopolitical risks	**ML**
Institutional framework and governance risks	**MU**
Environmental risks	**L**
Monitoring and Evaluation (overall rating) Sub criteria (below)	**MS**
M&E Design	**U**
M&E Plan Implementation (use for adaptive management)	**MS**
Budgeting and Funding for M&E activities	**HS**
Project Management	**S**
UNIDO specific ratings	**S**
Quality at entry / Preparation and readiness	**MU**
Implementation approach	**S**
UNIDO Supervision and backstopping	**S**
Overall Rating	**S**

Key recommendations

Based on the terminal evaluation and findings of this report, the evaluation team prepared several recommendations that can contribute to the reduction of GHG emissions through promotion of renewable energy based rural mini-grids for productive uses and energy access in Chad in the future after termination of this

project. The recommendations designees are the Government of the Chad and for UNIDO.

The following recommendations can be given UNIDO:

1. The project should be transferred and owned by ADER (Chadian Renewable Energy Development Agency) as a fundamental condition for the best follow-up of the solar installations and project sustainability.

2. For future projects, greater level of detail and study is required at the Project Preparation Grant (PPG) stage in order to create a strong project baseline.

3. In remote undeveloped areas a more holistic approach is needed to ensure delivery of all the potential impacts – for example electricity alone will not develop productive activities if there is also a need for awareness raising and micro-finance to set up businesses.

The following recommendations can be given to the Government of Chad:

1. ADER and the Ministry of Energy and Petrol should ensure to continue reinforcing the local technical capacities, which will allow the most efficient maintenance of the solar mini-grids.

2. Training for technical failures and malfunctioning should be organized by ADER, which will allow to share intervention responsibilities between the local technical team and a technical team based in N'Djaména.

3. The Chadian Government should consider the feasibility of encouraging Public-Private initiatives for operating with RE mini-grids after the departure of TTA.

4. The Chadian Government should accelerate the processes of validation and passing of the Law on National Strategy of Electrification, including the Business Plan for Renewable Energies as well as the Renewable Energy Law.

5. ADER and the Ministry of Petrol and Energy should rapidly examine the Draft of the Document of Cabinet Sylvanus and propose necessary amendments for its finalization. Both should organize a meeting of the main stakeholders in the process of finalization of the Renewable Energy Law on Electrification and the Code.

6. The Chadian Government should be sensitized to undertake public awareness activities, and take advantages of renewable energies based on the pilot project sites already constructed and functioning (Mombou, Douguia and Guelendeng).

7. Seek co-financing from donors for funding for implementation of new Renewable Energies projects in Chad (replication of pilot projects).

Main lessons learned

The following lessons were learned from the implementation of this project:

1. Clear communication is very important to manage expectations and avoid future misunderstandings during project implementation.

2. Realistic timing and a thorough understanding of the challenges to doing business in the target country should always be allowed for.

3. Project start-up time should be built in into project design in order to avoid project delays.

4. In-kind co-finance should be included as a form of co-financing in the Project Document with activities listed in the in-kind co-finance already there (for instance: office space, lending personnel etc.), and one should be realistic about country's ability to commit cash and in-kind form of co-financing altogether.

5. Co-finance should be ensured and available at the start of the project.

6. Providing of co-financing from the private sector should be ensured at the beginning of the project.

7. Flexible management is required to finish project implementation and allowed the project to be flexible and to finish implementation even with lack of co-financing.

8. A Mid-term review is of utmost importance as a tool to steer the project in the right direction, especially if unexpected situations that ought to be corrected appear during project implementation (lack of major co-financing, Ebola etc.).

1. Project background

1.1. Country background

With an area of 1,284,000 km², Chad is the 21st largest country in the world and the 5th on the African continent after Sudan, Algeria, Congo and Libya. Located in Central Africa, is a landlocked country N'Djamena is 2100 km from the nearest port, the one of Douala, Cameroon. Chad is surrounded by six countries: Libya to the north, the Central African Republic to the south, Cameroon, Niger and Nigeria to the west, Sudan to the east.

The Chad belongs to both the Saharan zone in its northern part, and the Sahelian zone to the southern part. Located between the 7th and the 24th latitude, the 13th and 24th of the East longitude, Chad begins at the edge of the equatorial forest in the south, before they extend to the Sahara desert to the north. Landscapes as varied digest as each other, it is spread over a length of 1700 km from north to south and 1,000 km from east to west.

1.2. Overview of the economy and electricity situation in Chad

Chad, which joined the Organization of Petroleum Producing Countries (OPEC) in 2003, has become highly dependent on this resource. Before the advent of the "oil area", Chad's economy was mainly based on agriculture, and the gross domestic product (GDP) averaged US $ 220 per capita in 2001-2002 (less than half the average SSA). In 2013, GDP stood around 1226 dollars per capita. The sharp rise in revenues from oil exploitation has resulted in a substantial increase in public spending on social programs to fight against poverty and improving health. But the decline in the poverty rate (from 55-47%) observed between 2003 and 2011 was largely caught by the excessive population growth and, thus, the total number of poor in Chad has increased by 15%.

Economic performance remained stable in 2014, with a slight acceleration of growth despite the temporary suspension, by the Chadian authorities, the operations of the Chinese National Petroleum Company (CNPC) and delays in oil production. Real GDP rose 7.3% in 2014, against 5.7% in 2013, mainly thanks to oil revenues and improved agricultural production due to abundant rainfall and public investment in rural areas. On the fiscal side, the primary non-oil deficit has fallen from 20.1% of non-oil GDP in 2012 to 17.5% in 2013. This trend is expected to continue in 2014 (16.4% according to estimates), under the effect of the reduction in security spending and oil revenue. Sealed by the oil price collapse in the second half of 2014, budget revenues fell 5.4%, in contrast to non-oil revenues which increased to 11.4%, was slightly above expectations.

Budgetary efforts of the country were accompanied by the reference program of the International Monetary Fund (IMF), hired in July 2013 which was completed satisfactorily in December 2013. Extended Credit Facility (ECF) was granted by the Board of directors IMF August 2014. the implementation of the FEC over the next six months is the main condition for reaching the completion point under the Initiative for Heavily indebted Poor countries (HIPC). The IMF is currently assessing this implementation.

1.2.1 Overview of the electricity context in Chad

Chad is rich in natural resources yet it is one of the poorest countries in the world, classified by the 2013 Human Development Index (HDI) at 184 out of 187 countries. Energy consumption is very low (estimated at 292 kg of oil equivalent per capita in 2005) and as much as 90 % of the country's total energy consumption comes from traditional sources of energy, such as fuelwood. The Sustainable Energy for All 2010 baseline reports national electricity access at 4% broken down into 15% of the population with electricity access in urban areas and 0% access in rural areas. Only 16 of the 84 towns in Chad have an electricity network.

Lack of access to electricity limits social and economic development in Chad and limits investment and growth in productive sectors. The Chad government fully recognises this and has set, as one of its key development policy objectives, the need to ensure the reliable and adequate supply of energy. However to date there has been little investment in rural electrification which faces a number of institutional, economic and awareness related barriers.

Most of the existing electricity generation is based on fossil fuels. This reliance on fossil fuels for electricity generation results in relatively high greenhouse gas (GHG) emissions. Chad has significant renewable energy resources and renewable energy offers a clean alternative to fossil fuel dependent electricity generation. Not only are the on-going operation and maintenance costs significantly lower than the fossil fuel based systems they could replace, they also result in avoided GHG emissions and less reliance/exposure to volatility in the international oil markets. Renewable energy is particularly suitable for rural areas where the existing grids, do not currently, and will not reach in the near future and where renewable energy can provide the least cost energy supply option for income generation and socio-economic activities.

1.2.2 Development issues, energy consumption and electricity

The country is ranked 184th out of 187 according to the 2014 Human Development Index of the UN Development Programme. Despite improvements in education and access to clean water, many Chadians still suffer severe deprivation and most of the Millennium Development Goals (MDGs) will not be achieved in 2015. Between 2003 and 2011, Chad recorded moderate but significant progress in terms of overall

poverty reduction, with a national poverty rate has fallen by 55-47%. The advances are clearly more important in terms of extreme poverty (number of people living on less than $ 1.25 a day), since the rate fell from 63.3 to 36.1% during this period. Advances in terms of non-income poverty are modest, a wide range of critical needs still not covered.

Chad is a country whose energy consumption is very low, energy consumption rose from 200 in 1993 to 240 kep in 2002 and to 292 in 2005. kep Wood fuels (wood and coal) still account for 90% of energy consumption, against only 10% for conventional energy sources (petroleum products and electricity).

Households cooking mainly using wood fuels (88%) and mostly using light oil lamps (69% of households).

The Document Of Powerty Reduction Strategy (PRSP) reported that in 2003 only 1% of the Chadian population and 9% of the population living in N'Djamena has access to electricity. These data show that electricity consumption per capita in Chad is the lowest in the world, in the order of 10-20 kWh per person (compared to the world average of 2600 kWh / person).

The availability of modern energy is not only source of income-generating activities (pumping for agriculture, energy for industrial machinery ...), but also useful for basic social services such as drinking water supply and sanitation, health services, education (lighting and sanitation in schools), health (drug refrigeration, sterilization, etc.). By limiting the development of income generating activities, lack of access to energy contributes to rural exodus, depriving the rural world of able people for production.

Indeed, the problem of access to electricity is accentuated by the exorbitant costs that it generates in rural areas constitutes a major constraint for the development of the country. Chad remains the lagging behind of most Sub-Saharan countries in the field of rural electrification home to 2/3 of its population. The weakness of energy affects all aspects of development where access to electricity is one of the conditions for the achievement of the Millennium Development Goals (MDGs).

1.2.3 The obstacles to achieving objectives within the electricity sector

In Chad, the issues of energy in general were managed until 2008 by the Ministry of Mines and Energy, through its Energy Department. In 2009, the Energy Component of this Ministry was attached to the Ministry of Petroleum which now depends on the Energy Department.

The Ministry of Energy is responsible for the Government to define and implement its energy policy. The Energy Department develops strategies, developing programs

and projects and supervises their implementation while measuring their level of performance in terms of objectives and impact on people's lives.

Beyond energy policy conducted by the various governments in place, Chad has subscribed to the international commitments which the most important are:

- The Millennium Declaration (Item 7 on the preservation of the environment including the issue of climate change caused by the emission of gas with greenhouse effect);
- The declaration of the Heads of State and Government on the Sector Development in Central Africa Electricity of 30 October 2007 whose commitment to integrate energy sector as consultation and bring in execution regional and national programs of the member states of ECCAS.

Chad is also involved in regional projects including:

- The Power Pool of Central Africa (PEAC) which promotes cross-border interconnections between Member States of ECCAS,
- Ease Energy CEMAC funded by the European Union through the ease and Energy concerns the intensive peri-urban electrification with a target of 12,500 additional connections for Chad.

All of these commitments, the actions like the strategies implemented are intended to satisfy a lower cost energy needs of the entire population, to expand access to energy for the benefit of production agriculture and industry to promote alternative energy sources (solar and wind) in order to limit the impact of cutting firewood on the regeneration of forest resources.

The average for the rural population access to modern energy services is the ability of the country to connect all parts of the electricity network or to set up decentralized and autonomous mini systems. For Chad, the extent of the territory and dispersion of villages makes it difficult to develop connections to non-existent national or regional electricity grids.

1.2.4 Technical and financial obstacles for the electricity sector

Despite the investments made in recent years to provide the most major cities of Chad in energy infrastructure, the problem of the management of these facilities arises. This problem is mainly due to the absence of a clear institutional framework and regulatory framework to define the role of key actors in the sector.

Electrical installations managed by SNI in major centers (N'Djamena, Sarh, Moundou, Abéché and Bongor) have not kept pace with population growth. Add to this the structural problems specific to the SNE, dilapidated facilities and fuel supply problem, the main source of energy, which problem is exacerbated by the soaring prices of oil on the international market.

Since August 2008, the Chinese company CNPC and SHT have begun construction of a refinery in Djarmaya. The production capacity of this refinery is 20,000 barrels / J crude oil and 250 000 m3 / d of natural gas. It is also planned the construction of a natural gas power plant with a production capacity will be 11 megawatts. The well planned power plant is intended to supply electricity to the city of N'Djamena in the medium term without the possibility of covering the needs of other cities or towns Chad.

Like the Saharan and Sahelian countries, Chad has a huge potential for solar energy, unfortunately none of these countries has yet developed power plants, as rependues worldwide.

Due 4 to 6 kWh / m² / day, an area of 1 km² receives raw energy of 1500 GWh per year. Including a yield of 15% in the sector of photovoltaic cells and equipment 50% of the area under consideration, 1 km² equipped would produce 110 GWh per year, which corresponds substantially to the production of SNE in 2006.[1]

1.3. Project overview

The project was initiated by UNIDO and the Government of the Chad as part Chad's efforts towards introducing, developing and promoting a market environment that will stimulate renewable energy investments in its rural areas. It was designed as a three-year full-size project (FSP) as part of the GEF-4 replenishment cycle. The Project Preparatory Grant (PPG) was approved by GEF in April 2009 and endorsed by GEF Chief Executive Officer (CEO) in April 2012. The Project was officially launched in June 2012. An overview of the Project is given in form of a Project Fact sheet in Table 2.

UNIDO, with a funding grant from GEF, is the Implementing Agency (IA) for the project "SPWA-CC: Promoting Renewable Energy Based Mini-Grids for Rural Electrification and Productive Uses in Chad", with the main objective being "to reduce GHG emissions through promotion of renewable energy based rural mini-grids for productive uses and energy access in Chad".

Table 2 Project Fact sheet

Project Title	***SPWA-CC: Promoting Renewable Energy Based Mini-Grids for Rural Electrification and Productive Uses***
GEF ID	**3959**
UNIDO project No. (SAP ID)	**100184**
Region	**Africa**

[1] Source: Outline of Master Plan for Energy of Chad

Country(ies)	**Chad**
GEF Focal area(s) and operational programme	**Climate Change** **CC-3; CC-4**
GEF Agencies (implementing agency)	**UNIDO**
Project executing partners	**Ministry of Mines and Energy**
Project size (FSP, MSP, EA)	**FSP**
Project CEO endorsement/Approval date	**12 April 2012**
Project implementation start date (PAD issuance date)	**01 May 2012**
Original expected implementation end date **(indicated in CEO endorsement/Approval document)**	**01 November 2014**
Revised expected implementation end date (if any)	**31 October 2015**
Actual implementation end date	
GEF Grant (USD)	**1,758,182**
GEF PPG (USD) (if any)	**60,000**
UNIDO inputs (USD)	**60,000 (cash)**
Co-financing (USD) at CEO Endorsement	**1,801,364 (cash + In-kind)**
Total project cost (USD) **(GEF Grant + Co-financing at CEO Endorsement)**	**3,619,546**
Mid-term review date	**December 2014 – January 2015**
Planned terminal evaluation date	**September – November 2015**

Based on interviews with stakeholders, the project was identified and developed, in a highly participatory manner, with relevant national institutions and private sector actors involved in renewable energy in the Chad.

Intervention logic of the project

The overall objective of the project is to avoid greenhouse gas emissions by promoting renewable energy technologies for mini-grid rural electrification for productive uses in Chad.

The project: "Promoting renewable energy based mini-grids for rural electrification and productive uses in Chad" is expected to remove the institutional, technical,

knowledge and awareness-related barriers to the promotion of a market approach for the development of mini-grid connected renewable energy systems to meet the growing need for access to electricity in rural areas, which is currently met or likely to be met by fossil fuels. This will be done mainly through (i) creating a critical mass of skilled and knowledgeable technicians and public officers; (ii) pilot projects, building awareness about the appropriate technologies and the best practices; (iii) linking energy services with productive uses, and (iv) putting in place policies encouraging the involvement of the private sector and providing access to innovative and smart financial mechanisms.

The project aims to establish around 5 pilot sites (mainly Photovoltaic (PV), but also waste-to-energy or mini hydro, etc.) in off-grid isolated communities on a market-oriented public-private partnership approach. Pilot sites will be selected on the basis of their potential to use the generated energy for productive uses that will generate income.

The project consists of three components:

Component 1. Institutional, policy and financial mechanisms: this project component aims at strengthening the policies and regulatory mechanism to effectively promote and support market based development through measures encouraging public-private sector partnership and smart financial mechanisms. This will be done through raising the awareness and building the capacity of the stakeholders and formulating an effective, market-oriented policy framework to stimulate investments in renewable energies.

Component 2. Identification of a portfolio of solar PV sites and preparation of feasibility studies: this project component will improve existing information and data on PV potential sites by preparing prefeasibility studies on a number of sites indicating parameters related to their generation potentials, socio-economic profiles of beneficiaries and estimated costs. This will facilitate replication and enable, for the decision makers, the prioritization of investment, and will provide the private sector developers and investors with a tool to make informed selection and decide on the needed inputs to develop a given site into a sustainable clear energy enterprise.

Component 3. Technology demonstration and creation of awareness and technical capacities: this project component aims to demonstrate the technical and economic feasibility of the photovoltaic based mini grids and using the process for on-the-job training and the creation of technical capacities. Besides providing access to clean energy for productive use, the established photovoltaic based mini grids will raise the awareness of private sector investors, financing institutions, developers and donors on the untapped potentials for producing clean energy and GHG emission reductions.

Component 4. Monitoring and Evaluation (cross-cutting)

Deadlines and milestones

The information on the main project dates and milestones is shown in Table 3:

Table 3 Milestones and main dates for the GEF-4 RE project in the Chad

Milestone	Expected Date	Actual Date
Project CEO Endorsement/Approval Date	February 2011	April 2012
Project Implementation Start Date (PAD Issuance Date)	May 2012	May 2012
Original Expected Implementation End Date (indicated in CEO Endorsement/Approval document)	November 2014	October 2015
Revised Expected Implementation End Date (if any)		October 2015
Terminal Evaluation completion	November 2014	October 2015
Terminal Evaluation Date		November 2015

According to the Project Managers (PMs), GEF Project Management Information System (PMIS) and the Project Implementation Reviews (PIRs), the project has been extended for eleven months. Original expected implementation end date was November 2014, but has been revised to October 2015. There was no delay between the date of CEO Endorsement to the actual start of implementation – the official launching of the project. The Project Coordination Unit (PCU) started its activities only in May 2012. Altogether, the project has achieved its targets as they were revised during the Mid-Term Review by the time of the Terminal Evaluation.

Project stakeholders

According to multiple sources involved in the project design phase, a wide range of stakeholders were consulted during the design. The table 4 below lists the main stakeholders, showing in detail their role in project preparation and implementation.

Table 4 Project Stakeholders

Project Stakeholders
Government of the Chad
PROJECT EXECUTING PARTNERS **Ministry of Oil and Energy (MOE) of Chad**
NATIONAL EXECUTING AGENCY / COUNTERPART **Ministry of Environment**
NATIONAL EXECUTING AGENCY / COUNTERPART

Ministry of Finance and Economy
IMPLEMENTING AGENCY **UNIDO**
NATIONAL COUNTERPART / CO-FUNDER **National Government of Chad**
INTERNATIONAL COUNTERPART / Demonstration Projects Executor **TTA (Tramatecno Ambiental)**
GEF FOCAL POINT
Private sector dealing with Renewable Energy in the Chad
Energy professionals and service providers
Training institutions
Rural energy users
Potential energy generators (managers, developers and engineers)

The Ministry of Energy and Petrol is the main counterpart agency, and the Directorate of Energy, in particular, by virtue of its central role in energy. The Directorate is responsible for setting energy policy including rural energy. In the past two years the Directorate of Energy has established units for energy planning, for electricity and for renewable energy. In addition a national Agency for the Development of Renewable Energy (ADER) has been established. The Renewable Energy unit is responsible for renewable energy policy whilst ADER is responsible for the coordination of all the projects and programmes related to renewable energy. As part of the Terminal Evaluation each of these stakeholders was consulted on the project results and impact.

Project impacts and targets

The end of project targets included at the project design were:

- Total direct CO2eq emission reductions as a result of the project – target 3900 tonnes
- Total indirect CO2eq emission reductions as a result of the project – target 19,500 to 24,700 tonnes (over 10 year lifetime, 2014-2024)
- Number of new electricity connections – target 1250 households, institutions and businesses
- Number of people with electricity access – target 6250 people

The expected project outcomes from these project components, as stated in the project documents, are:

- An effective, market-orientated institutional, financial, policy and regulatory framework to stimulate investments in renewable energy;

- A portfolio of RE energy projects prepared for pilot private sector investments during and post the GEF project;
- Reduced GHG emissions and increased access to rural electrification.

Project implementation arrangements

UNIDO is the only GEF Implementing Agency for the project and therewith holds the ultimate responsibility for the implementation, the delivery of the planned outputs and the achievement of the expected outcomes as GEF Implementing Agency. The project is directly executed by UNIDO in collaboration with the Ministry of Oil and Energy (MOE) of Chad.

UNIDO is responsible for the general management and monitoring of the project, and for reporting on the project performance to the GEF, as well as for the procurement of the international expertise, technologies, equipment, services etc. needed to deliver the outputs planned under the five project components. It also manages, supervises and monitors the work of the international teams and ensures that deliverables are technically sound and consistent with the requirements of the project.

A Project Coordination Unit (PCU) was established within the Directorate of Renewable Energy in Chad, consisting of a Project Coordinator and the Project Administrative Assistant. The responsibilities of PCU are were: coordination of all project activities carried out by the national experts and other partners by having close association with the Ministry of Energy/State Governments, day-to-day management, monitoring and evaluation of project activities as per planned project work, and organization of the various seminars and trainings.

A Project Steering Committee (PSC) was established in order to review the progress of the project implementation, to facilitate co-ordination among project shareholders and to maintain transparency in ensuring ownership and to provide support for the sustainability of the project. The PSC has a balanced representation from key stakeholders including counterpart ministries, GEF operational focal point, private sector representatives and UNIDO. The committee was chaired by the Director of Renewable Energy of the Ministry of Energy and Petrol and meets once or twice a year.

A detailed work plan for the entire duration of the project has been developed by UNIDO in collaboration with the PCU and Ministry counterpart. The working plan is used as management and monitoring tool by PCU and UNIDO and it is to be reviewed and updated appropriately on an annual basis. Figure 1 shows a diagram of the project implementation arrangement.

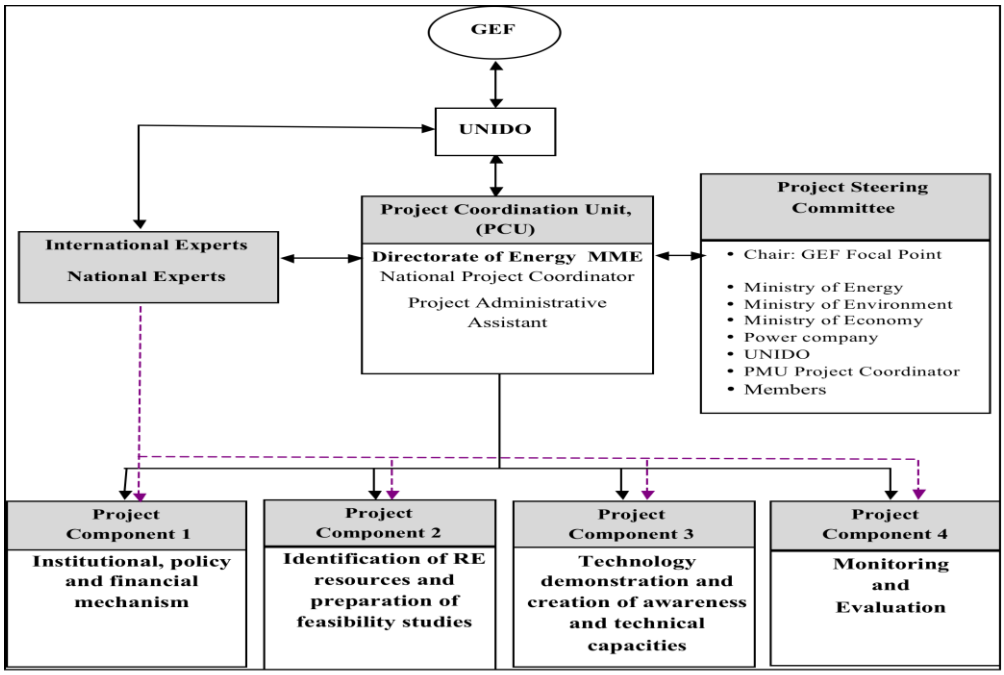

Figure 1 Diagram of project implementation arrangement

Project financial framework

In the Project document, the GEF financing was planned to amount US$ 1,758,190. At the time of the Terminal Evaluation, the total Executed Budget (A Term for Disbursements in UNIDO SAP) of the GEF Grant was US$ 1,767,926.84, which amounts to 98.3 % of the total GEF budget spent.

The co-financing planned in the project document amounted US$1,801,364. However, only US$ 771,000 was received and spent in co-finance, 42.8% of the amount of US$ 1.8 million that was foreseen at the beginning of the project, which is US$ 1,030,364 less cofinancing than planned.

71.3% of the total project budget had been spent by end of the project in October 2015. Planned was a total project budget of US $ 3,559,546, and received and executed were only US$ 2,538,926.84 from the GEF Grant and the co-financing. Project financial details will be discussed under the chapter Efficiency.

2. Introduction to the terminal evaluation

According to the GEF Monitoring and Evaluation Policy, Terminal Evaluations are mandatory for all GEF Medium Size Projects (MSPs) and Full Size Projects (FSPs). Hence, UNIDO as an Implementing Agency of the GEF, and in accordance with UNIDO Evaluation Policy, an independent Terminal Evaluation of the project: "Promoting renewable energy based mini grids for productive uses in rural areas of The Chad" was conducted in the period from 01 September 2015 to 30 November 2015.

2.1 Evaluation scope and objective

The Terminal Evaluation covered the duration of the project from its starting date in April 2012 (more precisely from its launching date in May 2012) to the project closing date for the Terminal Evaluation in October 2015. The scope of the evaluation includes assessment of project performance and progress against the evaluation criteria: relevance, effectiveness, efficiency, sustainability and impact. In the Terminal Evaluation, a special accent is put on the forward-looking approach on future sustainability of the project.

The overall objective of the evaluation is to assess to what extent the project has achieved the expected results at the time of the Terminal Evaluation, i.e. to what extent the project has promoted renewable energy based mini-grids (solar) for rural electrification and productive uses in Chad.

The specific objectives of the evaluation are:

- Verification of prospects for development impact and sustainability,
- An analysis of the attainment of global environmental objectives, project objectives, delivery and completion of project outputs/activities, and outcomes/impacts based on indicators,
- Re-examination of the relevance of the objectives and other elements of project design according to the project evaluation parameters, and
- Enhancement of project relevance, effectiveness, efficiency and sustainability by proposing a set of recommendations with a view to ongoing and future activities until the end of project implementation.

2.2 Evaluation approach

The Terminal Evaluation was conducted in accordance with the UNIDO Evaluation Policy and relevant UNIDO and GEF evaluation guidelines and policies. It was carried out as an independent in-depth evaluation using a participatory approach

whereby key parties associated with the project were informed and consulted throughout the evaluation.

The evaluation team used different methods to ensure that data gathering and analysis deliver evidence-based qualitative and quantitative information, based on diverse sources: desk studies, literature review, individual interviews, focus group meetings, direct observation, presentations and feedback review.

The methodology was based on the following:

1. A desk review of project documents and relevant country background information:
   (a) The original project document, the inception phase report, monitoring reports (such as progress and financial reports to UNIDO and GEF annual Project Implementation Review (PIR) reports), Project Operational Manual, project annual work plan, output reports and relevant correspondence.
   (b) Notes from the meetings of committees involved in the project (e.g. approval and steering committees).
   (c) Other project-related material produced by the project.
2. Development of an evaluation matrix. The evaluation matrix is a tool for evaluating a project's progress by breaking down the elements of the project against the UNIDO parameters using a set of review questions. The evaluation matrix developed served as a framework for the subsequent stages of the review. The evaluation matrix for this Terminal Evaluation Report can be found in Annex C.
3. Interviews with project management and technical support including staff and management at UNIDO HQ and in the field, staff associated with the project's financial administration and procurement. List of all interviewed persons is given in Annex B.
4. Interviews with project partners including Government counterparts, GEF focal points and partners that have been selected for co-financing as shown in the corresponding sections of the project documents.
5. On-site observation of results achieved in demonstration projects, and interviews with potential beneficiaries of improved technologies. The evaluation field mission included visits of the national evaluation expert to the three demonstration project sites at Mombou, Douguia and Guelendeng.

6. Interviews with the relevant project's management and Project Steering Committee (PSC) and members and the various national and sub-regional authorities dealing with project activities as necessary were conducted.

Evaluation work plan

The "Evaluation Work Plan" included the following steps:

1. Following a desk review of project documentation, a briefing was done by the project manager and the methodology was developed.
2. In the period from 17 October 2015 to 23 October 2015, a field mission was conducted by the international evaluation expert together with the national expert.
3. At the end of the field mission, the evaluation team made a presentation of the preliminary findings and recommendations to the Counterparts in Chad and the PCU responsible staff.
4. Following the field mission, the main findings, conclusions and recommendations were presented and discussed with the project manager, evaluation representative and other relevant stakeholders at UNIDO Headquarters.

Evaluation team composition

The evaluation team was composed of one international evaluation consultant acting as a team leader and one national evaluation consultant, contracted by UNIDO.

The evaluation team was supported in its work by the Project Manager at UNIDO, the Project Coordination Unit (PCU) in Chad, the Government of Chad, UNIDO Office for Independent Evaluation the UNIDO GEF Coordinator.

2.3 Information sources

Written documents and reports from this project were reviewed in the inception phase at UNIDO Headquarters. Furthermore, relevant project documents were provided by the PCU, the National Project Coordinator, the Government of Chad, the Ministry of Petrol and Energy, ADER (Chadian Renewable Energy Development Agency), the Cabinet Sylvanus that was proposing the Draft Document on Rural Electrification Policy in Chad and the Draft Law of Electrification in the Chad in paper and electronic format in French and English during the evaluation field mission (List of Documents Reviewed is given in Annex D). Interviews with project stakeholders

were held at UNIDO Headquarters and Chad during the evaluation field mission (A list of interviewed stakeholders is provided in Annex B). Demonstration projects site visits were made to the locations of visits of the national evaluation expert to the three demonstration project sites at Mombou, Douguia and Guelendeng.

2.4 Evaluation limitations

Due to the security situation and warnings for travel outside the capital N'Djamena in Chad, and Boko Haram activities around lake Chad and the Cameroonian border (in proximity to all three project sites), it was agreed with the Office for Independent Evaluation that the International Evaluation Expert will not travel outside N'Djamena to visit the project pilot sites. The visit of the three project pilot sites in Mombou, Douguia and Guelendeng was conducted by the National Evaluation Expert alone, who conducted the interviews with local governments, TTA representatives and project beneficiaries, and taking photos from the sites. This limitation managed through extensive interviews with the company TTA that executed the solar installations on all three sites, which will be done by both international and national evaluation consultant in N'Djamena, and the extensive documentation for the pilot projects provided by TTA to the evaluation team.

2.5 Intended use of the terminal evaluation report

This Terminal Evaluation was conducted in accordance with GEF and UNIDO monitoring and evaluation policies and procedures and in line with United Nations Evaluation Group (UNEG) norms and standards.

The intended users of this Terminal Evaluation are the UNIDO Energy (ENE) Branch, Government Counterparts, Project Coordination Unit, and the GEF. If relevant, the terminal evaluation report may be disseminated to additional stakeholders to share lessons learned and future recommendations.

3. Project assessment

3.1 Project design and relevance

3.1.1 Relevance

The assessment of project relevance takes into consideration the project's contribution to the achievement of national objectives regarding renewable energy in Chad, GEF strategic priorities, and the project's relevance to UNIDO's mandate.

Generally, in the period between the Project design between 2008 and 2010, and this Terminal Evaluation in 2015, the Project has remained throughout very relevant. This has been assessed through the review of documentation and interviews with the project stakeholders.

Relevance to national priorities

The Government of The Chad has accorded special priority to improving access to electricity and to promoting renewable energy through various policies and institutional measures. The project outputs and activities continue to be clearly in-line with the Government policy and priorities. The Government has a target of 75% energy access by 2030, starting from a position of about 14% energy access. This project is in line with most national and regional policies as follows:

The National plan of rural electrification aims at finding alternative resources to increase the access to electricity of the populations in peri-urban and rural areas.

The Energy Strategic Plan recommends that solar and wind power are developed. The Minister of Energy confirmed this by stating that he believes that off-grid mini-grids and renewable are the way ahead for Chad since the grid will not extend to the rural areas quickly enough.

Additionally to the plans mentioned above, the Poverty Reduction Strategy Paper (PRSP) also includes for increasing the access to household electricity and to reduce green-house gas emissions.

In 2014 the Ministry of Environment of Chad made a request to the Clean Energy Solutions Centre to look at the potential for the use of renewable energy and the appropriate business models to develop mini-girds. The report was delivered in August 2014.

Relevance to GEF priorities

Furthermore, the relevance to GEF Climate Change focal area's Strategic Program 3 – Promoting market approaches to renewable energy is very clear. Through promoting the dissemination of renewable energy technologies, minigrids in

particular, in rural areas as support of rural electrification efforts in Chad, the project contributed to promoting market approaches to renewable energy and providing energy for productive uses. Moreover, the project was part of GEF Programmatic Approach to Access to Energy in West Africa, part of the Strategic Program for West Africa (SPWA), approved by GEF Council in November 2008, and therewith very relevant to GEF priorities.

This project aims to "promote on-grid renewable energy" and contribute positively to the market transformation process by the implementation of viable and sustainable RE pilot projects, which will enable the Government to further establish the appropriate policy and regulatory framework and contribute to climate change mitigation through replication of such projects.

Relevance to UNIDO's priorities

The project is fully in line with UNIDO's mandate, core competences and can benefit from UNIDO's comparative advantage as GEF's implementing agency in the renewable energy and climate change domain, as well as with UNIDO's work in Africa. The organizations' mandate is to support inclusive and sustainable industrial development, having strong core competences in the field of green industry and renewable energy for productive uses. This renewable energy project falls under the theme of environment and energy / environmental protection.

Overall, the Project is consistent with the focal areas/operational program strategies of GEF and is in line with the national development, energy and environmental priorities and strategies of the Government of the Chad, and UNIDO's mandate.

Based on the assessment of project relevance to local and national energy priorities, policies and strategy of the Government of Chad, to GEF's strategic priorities and objectives**,** and to the GEF focal area of climate change and SP3 - Promoting market approaches to renewable energy, and to UNIDO's mandate, **overall project relevance is considered to be HIGHLY SATISFACTORY.**

3.1.2 Design

The assessment of project design assesses the adequateness of the project to clear thematically focused development objectives set by the GEF, the attainment of which can be determined by a set of verifiable indicators. The projects are expected to be prepared in a participatory manner and with contributions of national stakeholders and/or target beneficiaries. It is required to formulate the project based on the logical framework approach, which was the case with this Full-Size Project (FSP).

The project document has been prepared based on results of various studies, and Government stakeholders were actively involved in the project design. In particular the pilot villages were selected by Ministry of Petrol and Energy (MPE) and Ministry of Environment with the aim to cover different representative village types – desert zone, fragile ecosystem and agro-pastoral. It is not clear to what extent the government was included in the design of Component 1 and 2. The communities at the pilot sites were also consulted during the preparation of the PPG feasibility studies.

Since the formation of Agence Developpement Energie Renouvable (Agency of Renewable Energy Development) - ADER in 2013, the agency has had the responsibility for the co-ordination and management of projects in RE. At the design stage, prior to ADER, there was consultation with a number of donors, in particular the European Union which had assisted the Government to formulate a draft energy strategy. The project design built upon this draft Energy Strategy and the original aim had been to work with the EU but rural energy in Chad, per se, is not one of the EU's priorities.

Other initiatives include those of United National Development Programme (UNDP); UNDP has a large climate change project which includes an RE component with an objective to support Chad to develop energy policies. So far they have carried out a consultation exercise for an action plan for RE and EE. The action plan is currently waiting for validation and this UNIDO project will link with this.

There are no other similar initiatives in Chad. Some work has been done with solar water pumping but otherwise there is little work and the other agencies are not actively developing physical projects with the exception of an UNDP project distributing solar cookstoves for 3,000 beneficiaries.

UNIDO also has a project for Energy Efficient Improved Cookstoves that is being implemented at the moment in Chad.

The UNIDO approach in renewable energy focuses not only on technical improvement and implementation of demonstration projects, but also on improvement in policy, management, investment strategy, operations, and financing. The overall project design is relevant, with its strongest side being strong participation of local stakeholders, represented by the Ministry of Petrol and Energy was the national executing partner for the project implementation. in project identification.

The Logical Framework with its outcomes and outputs, and target indicators are developed adequately (having the measurable element of being a SMART indicator) and they allow for proper adaptive management and monitoring of project results.

Project objectives, outcomes and outputs

The GEF and UNIDO have developed the Project "Promoting renewable energy based mini-grids for rural electrification and productive uses", with the objective to promote selected renewable energy technologies for mini-grid connected rural electrification in Chad and thereby avoid GHG emissions.

Based upon interviews with various stakeholders and review of Project documentation, the Evaluation Team considers that this objective remains highly relevant to addressing the issues of renewable energy and rural electrification in Chad. Therefore, it is clear that one of the objectives of the project was also to increase productive activities from the electricity access but this is not included in the objective statement, although it is in the project title.

The key impact targets, included as part of the Project Results Framework and in the initial monitoring and evaluation (M&E) plan are:

- Total direct CO2eq emission reductions as a result of the project – target 3,900 tonnes, and
- Total indirect CO2eq emission reductions as a result of the project – target 19,500 to 24,700 tonnes (over 10 year lifetime, from 2014 to 2024.

Although indicators were provided for numbers of connections no targets were provided in the framework for impact. The following targets are taken from one of the components:

- Number of new electricity connections – target 1,250 households, institutions and businesses
- Number of people with electricity access – target 6,250 people
- The overall objective for the project and the indicators for them are suitable and provide some of the picture for the attainment of the objective, although the baseline provided appears to refer to another project. In addition it would be good to understand how much renewable energy was installed (for example kW installed), how much productive activity was enhanced (for example number of businesses or number of new jobs) and to be able to have an idea of how RE is promoted nationally with an indicator referring to the strategic framework.

Primary target beneficiaries of the project are energy policy-making and implementing institutions, primarily the Ministry of Petrol and Energy (MPE) and The Agency for Development of Renewable Energy (ADER), potential energy generators (managers, developers and engineers), rural energy users, training institutes as Ecowas Centre for Renewable Energy and Energy Efficiency (ECREEE) and TTA, energy professionals and service providers and the financial sector.

The project consists of five technical project components, and their short overview containing the details of expected outcomes and outputs expected within the project components is given in table 5.

Table 5 Short status overview of the details within the project components

1. PD Component 1 (PC1) – "Institutional, financial, policy and regulatory framework", where activities were designed to support the Government to reinforce the existing policy, legal and regulatory framework for RE for mini-grids to effectively promote and support market based development through measures encouraging public-private sector partnership and smart financial mechanisms. The project design included for developing new regulation to attract the private sector to the RE market but no details were provided as to what this might include. At the same time it was foreseen an overall strategic framework for RE would be developed as well as capacity building activities. In the section providing details of the activities fewer particulars are provided. In addition the indicators provided for the work do not reflect these activities. The activities are very relevant to addressing the barriers but there was insufficient detail provided in the project document and the focus was on renewable energy more generally, rather than focussing on mini-grids. **2. PD Component 2 (PC2) – "Assist private developers with feasibility studies"**, where activities were to include identifying project sites for RE projects and to develop a portfolio of viable and bankable projects for PV mini-grids which could follow a Private Public Partnerships (PPP) approach. The document includes work related to energy resource data and site selection taking into account generation potentials, socio-economic profiles of beneficiaries and estimated costs. The target was to identify 10 sites and to "provide private sector developers and investors with a tool to make informed selection and decide on the needed inputs to develop a given site into a sustainable clear energy enterprise". The concept is relevant for addressing the barriers but in reality five sites had already been selected at the project design stage, in consultation with the government, and the reliance on the private sector being ready to express interest (or invest) was over-estimated. **3. PD Project Component 3 (PC3): "Technology demonstration, awareness raising and technical capacity development"**, where activities to include demonstration of the technical and economic feasibility of photovoltaic based mini grids and to use the process for on-the-job training and the creation of technical capacities were undertaken. As part of the PPG activities feasibility studies were prepared for the five identified sites. These feasibility studies were too simple, were not detailed and were not technically or

commercially robust and so therefore they over-sized the five systems and over-estimated the number of connections at each site. The idea was that besides providing access to clean energy for productive use, the established photovoltaic based mini grids will raise the awareness of private sector investors, financing institutions, developers and donors on the un-tapped potential of renewable energy and GHG emission reductions. This is highly relevant and appropriate for addressing the barriers.

4. PD Project Component 4 (PC4): "Monitoring and Evaluation" should make sure that the Monitoring and evaluation plan has been implemented. Furthermore, publications on lessons learned and toolkits should be produced and disseminated. The new energy installations should be covered by local/national business media.

5. PD Project Component 5 (PC5): "Project management and coordination" will focus on the management and coordination of the project.

The targets from the Project Logical Framework for all the project components that have been met can be found in the text below.

Figure 2 shows how the project components interact together in facilitating the development of a renewable energy market in Chad.

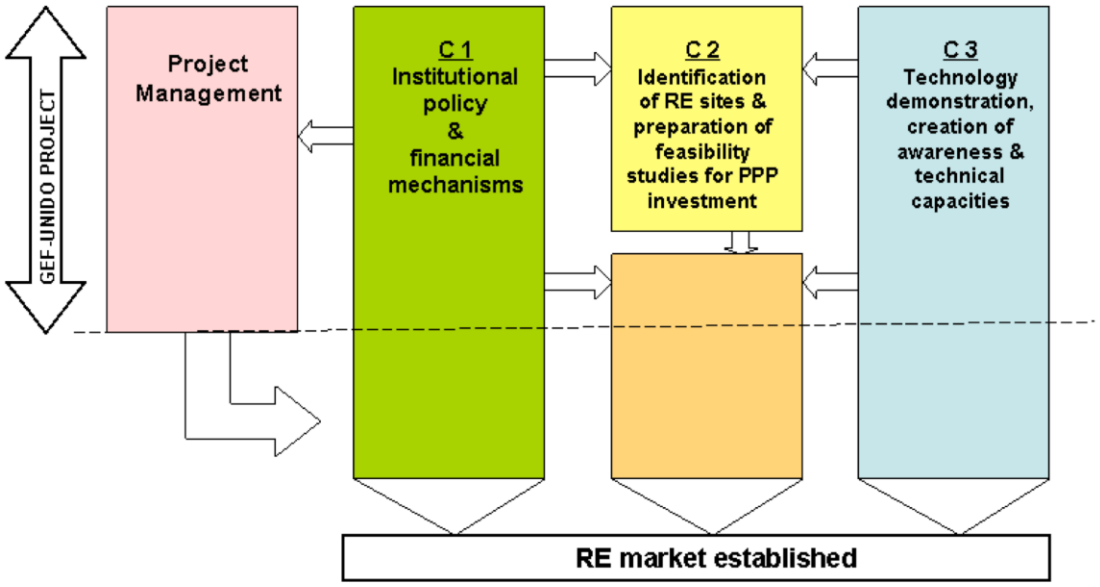

Figure 2 Interaction Between the Project Components

Project risk identification

Project risks are well identified in the Project Document with appropriate mitigation measures. Six significant risks were identified in the Request for CEO Endorsement (RCE) document that might prevent these project objectives from being achieved. The Evaluation team believes that the main risks were well-identified and the overall project risk is fairly low assuming the mitigation measures are followed. However one risk was omitted and the probability of some of the risks was underestimated as follows:

- One main risk was identified relating to the non receipt of the outstanding Government co-finance during the project. This is a significant risk and the money as planned in the Project Document were received up to project closing. UNIDO has already identified this risk and included it in its reporting to GEF (in PIR).
- The risk of oil prices falling was under estimated. Oil prices have halved in the last six months and this has an effect on the economic benefits of renewable energy. In practical terms this effects whether business customers at the demonstration sites connect to the mini-grid system. If there are fewer larger customers on the systems it reduces the mini-grid revenues thereby affecting the sustainability of the system. It also affects the Government's income and therefore availability of finance and the likelihood of further replication.
- The risk related to technical problems was also under estimated. Although it has been mitigated as much as possible a number of technical faults have occurred which impact the confidence of the users, and consequently the revenues from their payments (and so the sustainability), and the confidence of the government in replicating the approach.

Participatory identification and preparation of the project

The Project was identified and prepared through cooperation with local stakeholders, and through the cooperation previously established within Chad enabling activities supported by GEF (implemented with UNIDO involvement as well). The Chadian Government and the local project management office adopted the document, showing strong ownership of the project.

Project results framework

According to the GEF, the Project Results Framework in the CEO Endorsement document should detail the Project's objectives, the objectively verifiable indicators, targets, sources of verification and assumptions for each of the project activities, for the project outcomes and overall project impact. Still, in this project, the project results framework provides only a framework for the project outcomes' indicators; i.e. the framework does not provide verifiable indicators and targets for each of the

foreseen project activities or outputs. Therefore some of the indicators stated refer directly to activities.

Generally, there is a lack of consistency between the description of the project and what was included in the results framework at project design and displays a lack of understanding between outputs and outcomes. This lack of clarity makes it difficult to really understand all the expected outputs and outcomes of the project at project design.

During the Mid-Term Review it was recommended that a new Project Results Framework is prepared which reflects the activities and includes SMART indicators for each output and outcome. This Project Results Framework was accepted adopted by the Project Steering Committee after the Mid-Term Review of the project, which was also presented and accepted on the Mid-Term Review findings presentation in Vienna on 23 March 2015. The Original Project Results Framework from the Project Document from 13 February 2012 is part of the Annex 7 from ToR for this Terminal Evaluation presented in Annex A, whereas the new Revised Project Results Framework adopted after the Mid-Term Review is given in as Annex 8 from ToR for this Terminal Evaluation presented in Annex A.

The UNIDO project managers who took over the project in October 2012 realised that the project design lacked consistency and therefore a subsequent clearer work plan was agreed with the project steering committee (PSC) in April 2013 and a monitoring plan was also prepared. These subsequent plans display a better match between activity and indicators yet still the indicators are not all SMART and not all indicators include appropriate targets.

Based on the analysis given above, the **project design is rated as MODERATELY UNSATISFACTORY**, because the overall project design is quality is appropriate, however the baseline was not correct in the original Project Document. The Project Results Framework with its outcomes and outputs, as well as target indicators were not developed adequately (having the measurable element of being a SMART indicator) and they did not allow for proper adaptive management and monitoring of project results. Therefore, at time of the mid-term review, amendments to design have been carried out to: be in line with country needs and resources available, take into account the situation with the co-finance, and be more realistic of what is feasible to be implemented (only three out of the planned five demonstration project sites) for the given period of time with the given amount of finances.

3.2 Effectiveness

The section Effectiveness focuses on the Project's effectiveness until project closing, which means, the extent to which the Project has achieved its end achievements in terms of stated outputs, short- to medium-term outcomes, and progress toward longer-term impact including global environmental benefits and replication effects. Furthermore, this chapter contains the targets, achieved the overall results by the end of the Project and global environment objectives that were achieved by the Project (see Table 6 for a summary of progress towards meeting targets). Other elements that contribute to the effectiveness of programmes, including the implementation approach and the Project's risk management strategy to date, are included in later on in the parts on project co-ordination and management of this Terminal Evaluation Report.

Table 6. Main project impact and outcome-level indicators, their results achieved by the end of the Project

Project Strategy	Objectively Verifiable Indicators	Target	Results at the end of the project	Remark
Impact				
GEF Strategic Priorities: Strategic Program 2: Promoting EE in the industrial sector	Incremental direct and indirect CO2 emission reductions	Direct: 3900 tonnes CO2eq Indirect: 19,500-24,700 (over 10 year lifetimes)	Total kW installed is 121.7 kWc, and therewith estimated 1,737 t CO2 eq. GHG can be avoided.	**Achieved as Planned at Mid-Term Review.** As the co-finance did not materialise, the expected avoided GHG was possible if all five pilot projects are completed, based on the feasibility studies total annual generation is expected to be 251 MWh so avoiding 2,230 tCO_2 e. However, as this did not happen, the total kW installed amounted to 121.7 kWc, and therewith estimated 1,737 t CO2 eq. GHG are to be avoided.
	No. of electricity connections on selected sites	Approx. 250 connections per site (total 1250 hh and small businesses)	213 connections have been made in total for all the three pilot sites until project ending.	**Achieved as Planned at Mid-Term Review.** Following the preparation of the detailed feasibility studies the number of connections per site varies between 27 and 138. As stated in the Mid-Term Review, without cofinance only 213 connections were made.
	No. of selected local businesses and household with access to electricity on selected sites	No target provided in results framework	3 water pumps for market gardening are connected to the Mombou grid. In Douguia, SMEs are connected to its grid, and in Guelendeng consumers	No target provided.

Table 6. Main project impact and outcome-level indicators, their results achieved by the end of the Project

Project Strategy	Objectively Verifiable Indicators	Target	Results at the end of the project	Remark
			include public and administrative buildings like schools, hospitals and public lightning.	
Outcomes				
An effective, market orientated policy and regulatory framework to stimulate investments in RE	Availability of strategic framework for RE	Strategic framework for RE validated by government.	The Strategic framework for RE was done by a local legal firm and an international consultant have been contracted to carry out the work, however the Government has not validated it yet.	**Partly achieved.**
A portfolio of RE projects prepared for private sector investments during and post the GEF	Identification of number of project sites for installation of economically viable RE systems and prioritised for productive use	4-5 project sites identified and detailed feasibility studies prepared.	Five detailed feasibility studies have been prepared for Douguia, Mombou, Guelendeng, Mailao and Dourbali.	**Already achieved**.
Reduced GHG emissions and increased access to rural electrification	Incremental direct and indirect CO2 emission reductions	Direct: 3900 tonnes CO2eq Indirect: 19,500-24,700 (over 10 year lifetimes	Total kW installed is 121.7 kWc, and therewith estimated 1,737 t CO2 eq. GHG can be avoided. .	**Achieved as Planned at Mid-Term Review.** As the co-finance did not materialise, the expected avoided GHG was possible if all five pilot projects are completed, based on the feasibility studies total annual generation is expected to be 251 MWh so avoiding 2,230 tCO_2 e. However, as this did not happen, the total kW installed amounted to 121.7 kWc, and therewith estimated 1,737 t CO2

Table 6. Main project impact and outcome-level indicators, their results achieved by the end of the Project

Project Strategy	Objectively Verifiable Indicators	Target	Results at the end of the project	Remark
				eq. GHG are to be avoided.
	Number of connections per site and number of households and small local businesses with access to electricity	Approx.. 250 per site with a total of 1250.	213 connections have been made in total for all the three pilot sites until project ending.	**Achieved as Planned at Mid-Term Review.** Following the preparation of the detailed feasibility studies the number of connections per site varies between 27 and 138. As stated in the Mid-Term Review, without cofinance only 213 connections were made.
	Trainings conducted for the local authority officers and interested private sector service providers	8 trainings	Numerous trainings for the management of solar installations of 18 persons for the three sites (6 persons per site) Training for the maintenance and management technical teams, and for the financing of mini-grids Training of 12 engineers at N'Djamena for performing technical surveillance and maintenance of the project Two technical trainings for the public and private	**Partly achieved –** as the co-finance did not arrive the number of trainings had to be reduced to 5 diverse trainings.

Table 6. Main project impact and outcome-level indicators, their results achieved by the end of the Project

Project Strategy	Objectively Verifiable Indicators	Target	Results at the end of the project	Remark
			stakeholders: 1. HOMER software (35 persons trained) Management of mini-grids based on renewable energies (44 persons trained)	

Achievement of anticipated project outcomes and outputs

Generally, the Project has achieved the expected outputs and outcomes as they were changed during the Mid-Term Review, in case that the last portion of the co-financing does not arrive. As the co-finance was not available, the targets and results expected changed into the ones proposed at mid-term review. Additionally, the project has ended eleven months behind the original schedule.

Main achievements by the time of the Terminal Evaluation are: three demonstration projects are fully implemented, there are feasibility studies done for two additional sites that can be easily implemented if the financing stands, awareness raising is done, development objective and partial societal change reached, several trainings are done, beneficiaries are sensitized on RE, there are drafts of that should be urgently validated and passed by the Chadian Government on the Law on National Strategy of Electrification, including the Business Plan for Renewable Energies as well as the Renewable Energy Law on Electrification and the Code.

Although considerably slower than planned, the project achieved some its targets in Component 1 - related to an effective, market oriented policy and regulatory framework to stimulate investment in RE.

Much of the work for Component 2 was achieved (five feasibility studies) and work on institutional capacity building has been initiated, however some of the other activities were not completed.

Although slower than anticipated good progress is now being made on Component 3 but the original targets will not be achieved. The most significant constraint to achieving all the project results and outcomes is the budgetary situation with the absence of the remaining co-financing from the government. Numerous and continuous attempts have been made by the UNIDO management to advocate for a transfer of the remaining financial contribution however it is has still not been received by February 2015.

Other contributing factors to the fact that many of the output were not achieved at project end stem from the Project design being overly optimistic about the start-up pace of projects and the under estimation of the challenge in working in the country. In particular:

- It took time to put staff in place, and to contract consultants, to start implementing the project.
- There were changes in the project management personnel which delayed the start of some activities.
- Changes were made to the implementation of the pilot projects to account for possible delays in receipt of the co-finance. This further delayed the implementation of the pilots.
- The work identified in Component 1 at design was insufficiently detailed to take forward immediately. At the same time there was re-structuring of the Ministry of Energy and Petrol as well as staff changes at UNIDO. All together these issues delayed the contracting of legal consultants to take the work forward.
- Further detail of what has been achieved in each of the components is given below and above in Table 6.

For the Project Component 1: Institutional, financial, policy and regulatory framework:

The work done under Component 1 has been flexible in line with MPE's requirements and is likely to achieve its objectives by the end of the project. This project component aims at strengthening the policies and regulatory mechanisms to effectively promote and support market based development through measures to encourage renewable energy based mini-grids and public-private sector partnerships. One of the key and primary barriers for this is the lack of a legal basis for their development in Chad.

A local legal consultancy team and an international consultant have been contracted to carry out this work and the following outputs have been delivered by the end of the project:

- The Draft Document on Rural Electrification Policy in Chad was prepared by the Cabinet Sylvanus, commented by international expert, and submitted for validation and passing to ADER.
- The Draft Law of Electrification (RE) for Chad that pinpoints the development of the sector of mini-grids based on renewable energies in rural areas and the implication to the private sector was prepared by the Cabinet Sylvanus, commented by international expert, and submitted for validation and passing to ADER.

For the Project Component 2: Assist private developers with feasibility studies:

Progress has been made towards meeting the output-level targets to be achieved for Component 2. The main achievements in Component 2 have been the preparation of detailed feasibility studies for five sites and the start of the renewable energy capacity building. The feasibility studies mean that one of the targets has been achieved.

A contract was signed with TTA in December 2012 to prepare the feasibility studies and then to carry out the follow-on implementation. Five project sites were identified in consultation with the Government, and data collection, socio-economic surveys and technical feasibility studies were all carried out by TTA by March 2013, in line with the schedule. At the same time they consulted extensively with the local communities to help prioritise connections since it was clear that the designs would be smaller than envisaged in the project design, due to budget constraints. The results of the feasibility studies were presented to both UNIDO and at the first Project Steering Committee meeting.

ECREEE was contracted to deliver training on the renewable energy software, HOMER, to stakeholders in Chad. ECREEE developed training material, adapted from its training developed for trainers in ECOWAS, and delivered the training to 35 public and private stakeholders in N'Djamena in December 2014. A web based announcement was made for the training and participants were also selected by the UNIDO PCU and TTA. Training material and the software was distributed to all the participants and ECREEE staff have continued to provide support to the trainees post training.

The following further achievements have been reached:

- Numerous trainings for the management of solar installations of 18 persons for the three sites (6 persons per site).

- Training for the maintenance and management technical teams, and training for the financing of mini-grids were done.
- Training of 12 engineers at N'Djamena for performing technical surveillance and maintenance of the project.
- Two technical trainings for the public and private stakeholders:
  1. HOMER software (35 persons trained)
  2. Management of mini-grids based on renewable energies (44 persons trained)

From the part of promotion of productive use and value chain opportunities that use RE, a film as part of public awareness campaign was prepared for this project.

A renewable energy unit has been established within the MPE and staff from the unit received HOMER training. It is foreseen that the role of planning for RE will be carried out by ADER which also received training in HOMER.

The Project has had very limited success related to the activities involving private sector actors. The only successful private sector actor was IDEB, which is responsible for the installation of the PV systems and is now responsible for regular visits to the sites to check maintenance, update the payments on the payment system (graveur) and collect the money. To date the only real involvement, other than training, has been that a private sector organisation is sub-contracted to carry out the construction and maintenance of the demonstration projects. It is intended that there will be a meeting between public and private sector actors to discuss RE investment as well as the identification and mapping of the current status of private sector investments and key stakeholders. No work has been done on this as co-finance was not received.

From the Project Component 3: Technology demonstration and creation of awareness and technical capacities:

Almost all outputs have been made towards meeting the output-level targets for Component 3.

A contract amendment was signed with TTA in July 2013 which split the Component 3 work into two phases to take into account the delay in receipt of the Government co-finance. It was agreed with the PSC that Phase 1 would include mini-grids at Douguia, Mombou and Guelendeng. TTA visited each of these sites again to finalise the design and take into account any changes since the feasibility studies. At the same time they consulted extensively with the local communities. The final designs proposed with the detailed information on the implementation of the Demonstration Projects as shown are shown in Table 7 below.

Table 7 Renewable Energy Demonstration projects in the Chad[2]

	DOUGUIA	MOMBOU	GUELENDENG
PV Capacity (kWp)	45,4	39,6	36,7
Inverter power (kVA)	6x6	6x6	6x6
Battery capacity (kWh)	440	440	160
LV distribution line (km)	2,7	9,7	5,9
Public lighting (poles)	11	11	30
Objective (connections)	54	138	27
Electrification rate	50%	98%	13%

The proposed design was similar to that proposed in the feasibility studies with the exception that TTA now proposed underground distribution lines, rather than overground, as a better technical solution for Chad. The choice of underground distribution lines was accepted by the Mombou community and has the additional benefit of engaging the beneficiaries in the project. The proposed design including shelter under the PV panel canopy was also appreciated as innovative; rather than being ground mounted.

The design of the equipment was approved by the technical team (Project Manager) at UNIDO. The equipment was ordered and then further checks of the equipment and design were made prior to the shipment of the equipment from Spain. This was checked during a mission carried out by UNIDO Procurement and the Substantive Office. TTA built a mock-up of the system in Barcelona to ensure that the system works and so that all the equipment and parts could be pre-labelled to speed up the process on site.

The equipment was shipped to N'Djamena via Cameroon. From Barcelona to N'Djamana including clearance at customs took three months. UNDP helped with the customs clearance. This delayed the project slightly. Land was identified and provided by the local government in each case following discussions and negotiations carried out by the local project co-ordinator.
At the time of the MTR two PV-hybrid power plants have been constructed with a total capacity of 121.7 kW and 213 connections at Mombou, Douguia, and at Guelendeng. The details on the three project demonstration sites are given below:

[2] Source: TTA

1. PV Solar Mini-Grid in Mombou:

- Installed PV mini-grid with capacity of 39.6 kWc.
- 133 connections.
- Distribution lines, and local association and business model with tariffs have been established.
- Functioning since June 2014.
- The consumers include private households, public lightning, and water pumps for agricultural productive uses.

2. PV Solar Mini-Grid in Douguia:

- Installed PV mini-grid with capacity of 45.4 kWc.
- 54 connections.
- Distribution lines, and local association and business model with tariffs have been established.
- Functioning since June 2015.
- The consumers include SMEs (Small and medium enterprises) in the village (productive use) and public lightning.

3. PV Solar Mini-Grid in Guelendeng:

- Installed PV mini-grid with capacity of 36.7 kWc.
- 26 connections.
- Distribution lines, and local association and business model with tariffs have been established.
- Functioning since June 2015.
- The consumers include public and administrative buildings like schools, hospitals and public lightning.

The site Mombou is functioning since June 2014. A minor remark is made that the building of the two sites in Douguia and Guelendeng finished first in June 2015, which will be taken into consideration for the Terminal Evaluation in the Efficiency rating. However, it has to be noted that this is due to the difficult to impossible conditions of work due to security reasons connected to the Boko Haram activities exactly in this area.

In addition to the technical mini-grids, significant work has been done on the design of appropriate business models for the mini-grids and the establishment of Local Associations and management teams as well as the associated tariff setting and on-the-job training. The management team (made up of three) was contracted to the Local Association. Regular maintenance is carried out by the local technician, payments are collected by the manager and the gardien looks after security.

An N'Djamena company has been contracted by TTA as their local representative and 'level 2' maintenance contractor. This company, IDEB, was involved in the installation of the PV systems and is now responsible for regular visits to the sites to check maintenance, update the payments on the payment system (graveur) and collect the money. The revenue is used to pay

the management team, pay social security payments and to fund future equipment replacements.

Overall progress with the construction of the three demonstration sites was slower than expected partly due to the delays in transportation, due to discussion over the design and then having to wait for the end of the rainy season.

The Project has delivered on its outcome and impact targets related to the pilot projects, specifically with the capacity to avoid GHG emissions 1,737 t CO2 eq. GHG from the total kW installed is 121.7 kWc, and with 213 total connections.

The institutional strengthening was done primarily through the formation of the Agency for Development of Renewable Energy (ADER) in Chad.

Details for the Project Components 4 (Monitoring and Evaluation) and 5 (Project Management) are explained in the chapters 3.5 and 3.8 below.

Details on achievements per project component, outcome, output, containing the quantified and time-bound indicators and targets can be found in Table 6.

Contribution to achievement of Global Environmental Benefits

Project outputs and outcomes directly contribute to the implementation of the GEF Focal Area on Climate Change, namely to fulfilling the requirements of the 'Kyoto Protocol' unanimously adopted by the United Nations Framework Convention on Climate Change (UNFCCC). The ultimate goal of the project is to reduce energy use related emissions of greenhouse gases (GHG) produced by the energy sector of Chad. The project has contributed to the global environmental and energy benefit of reducing the energy produced by fossil fuels through exchanging it with energy produced from renewable sources, such as solar energy in the case of the demonstration projects within this project. However, the Global Environmental Benefits were not at the expected level during project design, due to the lack of co-financing. On the figure 3 below are presented the actual GHG that were avoided without the received cofinancing were 1,737 t CO2 avoided from the 121.7 kWc installed, instead of the originally planned 2,235 t CO2 in the project design phase. This was already known at the time of the Mid-Term Review.

	Without co-finance	With co-finance received by end March
Recommendations:	Revise targets in line with feasibility study results and foreseen activities.	Extension of the project by 6 months to allow additional time to meet objectives. Revise targets in line with feasibility study results and foreseen activities.
Project completion date	October 2015	March 2016
GHG avoided (t CO2)	1590	2235
Number of sites developed	3	5
Number of connections	219	300
kW installed (kW)	112	157
Number of trainings completed	3	8

Figure 3 Revised targets for the kW capacity electricity and avoidance of GHG emissions at the time of Mid-Term Review[3]

Catalytic and/or replicable role of the project

For the time being it is too early to judge longer term impacts or replication effects of the project – either at the demonstration sites or within the RE investment environment and supporting planning and legislative frameworks as the project has just ended.

However there is already recognition in Government that access to electricity for the rural population will not be solely through grid extension, nor only from fossil fuels. The Government is therefore very interested in the potential of RE mini-grids and specifically this project's business model for potential replication. The results from this project are likely to feed into future energy access planning.

The sustainability of the business model proposed will be partly dependent on an increase in the number of mini-grids to ensure that there is sufficient viability to attract a private sector actor to maintain and operate the systems. Without clear commitment from Government to roll out these systems the long-term sustainability and catalytic or replicable role of the project is limited.

At the demonstration sites the availability of electricity is expected to result in a growth of productive activities, a reduction in users' energy costs and in the avoidance of GHG emissions. At the one operating site, in Mombou, there are only three productive activity users (water pumping for market gardens) and reaction to the mini-grid service has been mixed. It is expected that other productive activities will grow in the village but it is likely to take a long time due to a lack of means to develop businesses (for example knowledge and finance). With the

[3] Mid-Term Review Presentation of Preliminary Findings

current users (majority are households at not very high density) a different approach with stand-alone technology may have been more cost effective. Therefore for future projects sites should be selected with clear productive uses of energy identified or in remote areas it would be recommended to combine electricity access with other activities relating to training for productive activities and micro-finance.

At the other two project demonstration sites, at Douguia and Guelendeng the volume of productive activities has grown a lot since they are towns which already have commercial centres. In Douguia, the consumers include SMEs (Small and medium enterprises) in the village (productive use) and public lightning. In Guelendeng, the electricity consumers include public and administrative buildings like schools, hospitals and public lightning. Where there are clear productive activities a mini-grid can be the most appropriate choice.

Project effectiveness at time of the Terminal Evaluation is rated as SATISFACTORY in the light of overall satisfactory project finalisation and implementation. Main outputs achieved by the time of the TE are: For the PC1: Institutional, political and financial mechanisms, the outputs have not been delivered yet, as the institutional framework to allow private sector operation is still not in place. Achievement if the creation of ADER (Chadian Renewable Energy Agency). Draft Document on Electrification Policy and Law on Renewable Energy exist, however they have not yet been amended and passed by the Government. For the PC2, detailed feasibility studies for mini solar grids have been prepared for five sites and diverse technical trainings have been delivered to 109 stakeholders on renewable energy, and technical maintenance. For the PC3 – the demonstration pilot project and creation of conditions for sensibilisation on photovoltaic technologies, three solar PV stations have been constructed with a total capacity of 121.7 kWc and 213 connections.

3.3 Efficiency

The assessment of efficiency should answer whether the project is implemented in a cost-effective way and presents least-cost option. It needs to consider if the project was delayed, and if yes did the delay affect cost-effectiveness. Efficiency also considers adequacy of contributions of government as well as the national executing agency for project implementation.

This subchapter gives an overview on the extent to which the Project has produced the results (outputs and outcomes) within the expected time frame.

The progress of the project was assessed against the existing log frame and corresponding targets and indicators. The way the annual progress report is submitted, it does not indicate the progress against planned timeline of targets.

Although the project was delayed by eleven months, and some activities are behind schedule, stakeholders interviewed did not raise any serious issues regarding the timing of their delivery and the timing of project completion.

The deliverables from PC 1 were to be submitted within six months of the start of the project. However it was decided to first concentrate on the pilot projects before starting on this part of the work. Terms of Reference were prepared and discussed with the counterparties to ensure they reflected the needs. There was then a delay in the appointment of a local legal team and following contract signature (in September 2014) there were further delays in starting the work due to delays in the first payment from UNIDO. Finally, the contract has been fulfilled end of August 2015.

Concerning PC 2, the contract with TTA was signed in December 2012 following negotiations to ensure that the work would compensate for the lack of detail in the project design. Despite delays at this stage the five feasibility studies were delivered in line with the schedule.

The revised training schedule (of 2014 workplan) planned for training in September 2014. ECREEE delivered HOMER training in December following some delays due to sub-contracting the trainer and the possible clash with another event in November. Another training relating to planning or design co-organized between ADER, TTA and ECREEE was delivered by the end of the project in October 2015, i.e. behind schedule.

In PC 3 the work at Mombou was in line with the original, and it was finished in June 2014, but work at Douguia and Guelendeng is behind schedule. Both were finished by June 2015 which was 12 months and 9 months late respectively. This is partly due to the pace of doing work in Chad, due to time taken to ship goods to Chad (and through customs), due to the rainy season and due to delays in finalizing designs. Due to the expectation of the arrival of electricity there is local support to deliver as soon as possible. This can be attributed to the fact that the first consultation with the communities was at project design in 2010 so it feels like a long time to wait for power. However, additionally to this is has to be mentioned that the fact that the work was delivered behind scheduled was due to the security situation in Chad and the Boko Haram activities that were particularly strong exactly very closed to the three project sites, and, at times the travel to them was impossible.

The GEF Grant of US$ 1.8 million (as described in Table 8) is to be leveraged with approximately US$ 1.8 million in co-financing allocated divided between UNIDO and the Chad Government.

Table 8 Total GEF Grant - financial contribution to the project

Type of Allocation	**Total GEF allocation (US$)**
Project Preparation Grant	60,000[4]
Technical Assistance / Investment	1,758,182
Total	**1,818,182**
Agency Fees	181,818 for technical assistance/investment)

At the time of the Terminal Evaluation US$ 1,767,926.84 of the GEF budget has been spent on technical assistance and investment. This is 98.3 % of the total GEF budget. US$ 32,073.16 remains of the GEF funding at the end of project and has been returned to the GEF.

[4] Plus an additional US$ 60,000 from UNIDO

71.3% of the total project budget had been spent by end of the project in October 2015. Planned was a total project budget of US $ 3,559,546, and received and executed were only US$ 2,538,926.84 from the GEF Grant and the co-financing. The same was due to the fact that only US$ 771,000 was received and spent in co-finance, 42.8% of the amount of US$ 1.8 million that was foreseen at the beginning of the project, which is US$ 1,030,364 less cofinancing than planned. This is significantly less than foreseen in the RCE, based on the activities and schedule set out – no detailed budget breakdown was provided in the project document. However, in general, the expenditures were in line with the current activities and delays in the project. Table 9 shows how the contribution is broken down by component and between GEF and co-finance. However, in has to be noted that at the end of the project the terminal expenditures were not able to be split between the project components as there were not enough information on this, so they were given as total expenditures.

Table 9 GEF financial contribution and Co-finance at the time of the Terminal Evaluation

	Project Design (USD)			**Terminal expenditure (USD)**		
Project Component	**GEF**	**Co-finance**	**Total**	**GEF**	**Co-finance (cash)**	**Total**
Component 1	50,000	50,000	100,000	1,767,926.84	771,000	2,538,926.84
Component 2	55,000	50,000	105,000			
Component 3	1,547,182	1,556,364	3,103,546			
Component 4	21,000	65,000	86,000			
Project Management	85,000	80,000	165,000			
Total	**1,758,182**	**1,801,364**	**3,559,546**	**1,767,926.84**	**771,000**	**2,538,926.84**
Additional PPG amount	**60,000**					
Total (including PPG)	**1,818,182**	**1,801,364**	**3,559,546**	**1,767,926.84**	**771,000**	**2,538,926.84**
% of total or co-finance allocation				**98.3%**	**42.8%**	**71.3%**

Least cost option for the demonstration project solution

The cost-effectiveness of the GEF project has been assessed through the perception of the stakeholders interviewed, and is assessed as being good. There are no similar projects in Chad to enable a comparison.

All of the subcontractors: TTA, ECREEE and ADER have delivered in excess of their Terms of Reference. TTA have contributed significant time to the project and included the socio-economic assessment and are also carrying out the operation of the mini-grids for the first year, in addition to the maintenance as agreed in the contract. ECREEE accepted a greater number of participants than included in their ToR, continued the course for longer hours than anticipated each day, have provided a help desk for participants post the training and will also carry out some feedback after six months.

As mentioned above it is important that demonstration sites are selected where there are clear productive users. At Mombou where there are mainly household connections using minimal electricity it may have been more cost-effective to meet their demand with a different technology solution (i.e. stand-alone products). However the aim of the project has always been to increase productive activities and for this a mini-grid can be the most cost-effective solution. In this case additional support would have been appropriate to ensure these productive activities start and thrive. However at Guelendeng there are mainly public electricity users, and in Douguia many commercial and SMEs users as well.

Co-financing

The total indicative co-finance included in the Request for CEO Endorsement was US$ 1,801,364 divided between cash and in-kind support from UNIDO (at US$165,000) and cash support from the Government of Chad at US$ 1,636,364. A commitment letter of January 2011 from the Ministry of Petrol and Energy was included in the CEO Endorsement document committing Chad to US$ 1 million to the GEF project.

US$ 708,812.26 was received from Chad on 21 May 2010, prior to the finalisation of the project design.

Following the commencement of the project a Trust Fund agreement was signed between UNIDO and the Government of Chad, represented by the Ministry of Petroleum and Energy, in August 2012 which commits Chad to co-finance of US$ 1.8 million, GEF finance to US$ 2 million and UNIDO finance to US$ 165,000. Based on this agreement the Government of Chad had still to transfer US$ 1,091,211, which were never received.

In April 2014 the Secretary General confirmed the fund commitment of US$ 1 million and that it had been included in the 2014 budget and was going to be transferred to UNIDO. In August 2014 UNIDO had still not received the funds and wrote to the Secretary General stressing the importance of the co-finance and noting that it would not be possible to complete the foreseen work without the funds. The funds were never received, and therefore, it will not be possible to achieve the project outputs and outcomes without the funding. Therefore, as it was stated in the Mid-Term Review if the project misses the planned co-financing the demonstration project sites were only three (Mombou, Douguia and Guelendeng) instead of five sites for which pre-feasibility studies existed.

Since the beginning of the project US$ 771,000 has been received and spent in co-finance, 42.8% of the amount of US$ 1.8 million that was foreseen at the beginning of the project, which is US$ 1,030,364 less cofinancing than planned. This has been spent on pilot projects, for

technical assistance and project management, as seen in Table 9 above. The split between co-finance sources is shown in Table 10.

Table 10 Co-finance committed, received and executed

Name of co-financer (source)	Type	Amount in RCE (USD)	Received (USD)	Promised (USD)	Executed (USD)	Notes
Government contribution	Cash	1,636,364	644,374.78	1,091,211	643,423	644,374.78 is 708,812.26 received minus the 10% agency fee. Note –PIR references are made to USD4.1m co-finance – but this is NOT in the RCE.
UNIDO	Cash and In Kind	165,000		10,000	77,500 + 50,077[5]	UNIDO in-kind contribution has been UNIDO office spaces for PM, project assistant and project management expert; computers and inventory, office costs
Total co-financing		1,801,364			771,000	

Additionally to the Government commitment in the Trust Fund agreement, there is also in-kind co-finance that was not included in the project design, which includes the office rental including utilities, the land for the pilot sites and significant time from the local populations at the pilot sites.

There is also un-recorded co-finance from the project beneficiaries. In particular personnel at MPE and ADER have spent some time working with UNIDO and their consultants on Components 1 & 2.

It is highly recommended to account for in-kind contributions at project design in future projects.

The Terminal Evaluation has concluded that Project efficiency is moderately satisfactory as efforts were undertaken to ensure cost-effectiveness (Efficiency of results delivered) of project implementation. The final tranche of co-finance promised and committed by the government has not been delivered, which caused that the project did not reach the overall impact as planned in the original project document. Materialized co-financing amounted to US$ 771,000 (cash and in-kind) instead of the planned US$ 1.8 million in the original Project Document, which amounts only to 42.8% of the planned co-financing. Activities with some of the trainings and the three demonstration projects were behind schedule, but fully completed for the three sites in June 2015, yet the Document on Electrification Policy and Law on Renewable Energy has not been passed yet by the Government. The perception of cost-effectiveness is very good. TTA, ECREE and ADER have delivered much more than in their Terms of Reference. Reviewing the final results from project management and financial management at time of the terminal evaluation, the **project efficiency is rated MODERATELY SATISFACTORY (MS)**.

[5] Based on an exchange rate of 1.2 USD = 1 €

3.4 Assessment of sustainability of project outcomes

The assessment of sustainability of project outcomes at the time of the Terminal Evaluation should explain how the risks to project outcomes will affect continuation of benefits after the GEF project ends, including both exogenous and endogenous risks. Based on GEF evaluation policies and procedures, the overall rating for sustainability cannot be higher than the lowest rating for any of the individual components. Therefore the overall sustainability rating for this Project at the time of the Terminal Evaluation is **MODERATELY UNLIKELY (MU), which means that there are significant risks that affect this dimension of sustainability.** This assessment is given taken into consideration two serious risks after the project ends, namely the Institutional framework and governance risks, and the Financial risks.

However, it has to be mentioned that the Project will likely have significant positive and sustainable impacts on the market for renewable energy and mini-grids beyond the duration of the Project. The solar mini-grids and business models are able to show that electricity access can be sustainable in rural communities. Demonstrating what is possible in terms of technical viability and new business models has the potential to increase the interest in renewable energy, and to have an impact on rural electrification policy and to commit resources to new mini-grids project. Furthermore, there are additional benefits due to building local capacity in the government and the private sector to allow for future project identification and design and supportive legislation.

3.4.1 Financial risks

There are four significant financial risks to sustainability:

1. Financial risks associated with the sustainability at each demonstration site exist. If the revenues are unable to cover the costs of management and future equipment replacement, the sustainability becomes questionable.
2. The lack of co-finance limited the number of demonstration project sites to three instead of five as planned originally in the Project Document. Three sites may not be profitable enough for a private sector operator to take on the maintenance for the future.
3. The existence of a strong oil lobby in the country might affects the allocation of finance and could reduce/divert money from renewable energy.
4. The technical risks related to problems at demonstration sites affect the revenues and ability to convince government to commit resources.

With the above said, **there are significant risks that affect this dimension of sustainability, which leads to Moderately Unlikely (MU)** sustainability of financial risks.

3.4.2 Sociopolitical risks

In Chad there is an insufficient public and stakeholders awareness of RE and the benefits of the mini-grids energy production, thus it is recommended to provide some awareness raising

activities after the project ends. The facts that the number of systems affects the viability of the RE concept brings moderate risks at the time being that affect socio-political sustainability, which might continue affecting the sustainability of the project in the future after the project ends.

Yet, there is high level of stakeholder ownership is good and the benefits are understood at both the Government and community level at the pilot sites. This level of ownership should be enough to ensure the sustainability of the existing pilot projects although there is a risk that implications of the level of management and equipment replacement needed has not been fully understood. The operation and maintenance organization(s) should be identified as soon as possible and contracted for at least ten years to incentivize the savings for replacements in order to mitigate the above mentioned risks. Further technical, financial and managerial capacity building is required for the community and also for the Government to enable it to take a greater role in the oversight of the management in case the community should take this role.

This causes **the rating for the sociopolitical sustainability to be Moderately Likely (ML)**, as there are moderate risks that affect the sociopolitical sustainability.

3.4.3 Institutional framework and governance risks

The institutional framework to allow private sector investment and operation of mini-grids is still not in place, and the legal documents developed by this project should be adopted as soon as possible in order for this risk to be minimised. Still, the private sector is not strong and there is limited technical capacity in the country so even with the framework in place there would be limited interest from the private sector in the short-term (to operate and maintain the existing systems, or to invest in new ones). An alternative proposed by a number of stakeholders (including Government) is that the existing systems be managed by the community, as is done in the water sector. This is possible with significant additional capacity building.

Future project ownership by the government would help alleviate some of the institutional framework risks.

There are significant risks that affect institutional framework and governance sustainability as institutional framework to allow private sector operation is still not in place, **which causes this sustainability to be Moderately Unlikely (MU).** Even though a Draft Document on Electrification Policy and Law on Renewable Energy exists, it has not been amended and passed by the Government.

3.4.4 Environmental risks

No environmental risks connected to sustainability could be identified related with the project that may jeopardize sustainability of the outcomes, **which means the environmental sustainability is Likely (L)** to be achieved.

3.5 Assessment of monitoring and evaluation systems and project management

This section assesses the M&E systems in place for the project. The M&E plan describes how the whole M&E system for the project works and includes the indicators, who is responsible for collecting them, what forms/tools will be used, and reporting schedules. The M&E plan includes the project logframe (project logical framework), baseline reports, periodic reports, and other documentation such as minutes of meetings, documentation of activities etc..

M&E Design

At the design stage, the M&E plan included a weak Project Results Framework and the intention that a detailed monitoring plan would be prepared at the beginning of the project. Even though the M&E Plan implies monitoring results and tracking progress towards achieving project objectives, the plan did not include a concrete and fully budgeted plan with SMART indicators, other than at an outcome level for all results and a baseline as set out in the GEF Minimum Requirements for M&E. There were no indicators were provided for outputs, not all targets provided were consistent with the activities described and the baseline is not provided for all the targets.

A monitoring plan was subsequently developed in 2013 and has been approved by the PSC. This included some further indicators but did not include indicators for more detailed outputs or outcomes and did not include targets for all the indicators.

The M&E Design not meet GEF Minimum Requirements for M&E, thus the **M&E design for this project is considered to be UNSATISFACTORY**.

M&E Implementation

The project had a functioning M&E system but was not systematic and the results framework was not used. M&E activities were to be based on the Results Framework provided in the CEO document and on an M&E plan to be designed at the outset of the project. However, as mentioned above, no M&E plan was prepared at the outset. An updated M&E plan was produced in 2013 with further indicators covering the project with just Phase 1 of Component 3. There were no indicators included for more detailed outputs or outcomes. It was not clear how frequently it is up-dated nor how it informs further work or management. Annual reporting on PIR correctly carried out at outcome level and sent to the GEF Secretariat in June 2013, 2014 and 2015. However, the use of the results framework is limited and there is no formal reporting on the project beyond the PIRs. Each demonstration site includes for monitoring of kWh (and so for GHG avoided).

According to UNIDO, a detailed work plan for the entire duration of the project has been developed in collaboration with the PCU and Ministry counterpart. The work plan is supposed to

be used as management and monitoring tool by PCU and UNIDO and is to be reviewed and updated appropriately on a yearly basis.

Annual workplans have been approved by the PSC in April 2013 and in April 2014. The initial workplan (2013) was based on the activities in the project design document and the second workplan includes an updated, more realistic, workplan which reflects the actual project activities. It is not clear how much reporting is done against this workplan. Reporting against the activities is included in the responsibilities of the local PCU but they have not completed the plan. Instead consultant reports, ad-hoc progress reporting and emails are provided as well as updates on field visits.

At the project design stage, no progress reporting was envisaged. UNIDO was up to date through regular emails, phone calls, visits and progress reporting from the main sub-contractor, TTA. TTA have provided progress reports against their deliverables between March 2013 and July 2014. A further report was done with the work completion of the three pilots.

Yet, the project was delayed by eleven months. Therewith the Mid-Term was delayed by twenty-one months of the original planning date from the PD, and was done in March 2015. The Terminal Evaluation was done six months after the Mid-Term Review at the end of the project in October 2015.

For all these reasons the **implementation of M&E and use for adaptive management is rated MODERATELY SATISFACTORY (MS)**, as the project had a functioning M&E system but was not systematic and the results framework was not properly used.

Budgeting and funding for M&E activities

The budget provided for M&E of US$86,000 at the planning stage was sufficient to include the implementation of the M&E plan, publications on lessons learned and toolkits produced and disseminated and information on mini-grids covered in national media. Although there was no budget planned for the Mid-Term Review, the same was conducted.

Adequate funding has been provided for M&E activities during the project implementation, and the necessary monitoring activities have been undertaken. The budget under the M&E plan included for USD 56,000 but was allocated against the final external evaluation and the dissemination of lessons learned. The aspect of funding M&E is rated SATISFACTORY.

Monitoring of long-term changes

There was no provision for monitoring of long-term changes at the project design stage. However each one of the three demonstration site was able to measure GHG emissions avoided. As part of the equipment installed at each PV hybrid power station there is metering equipment which allows for detailed monitoring of energy generated and delivered in kWh. These data were recovered by modem and is operating at all three project sites in Mombou, Dougouia and Guelendeng. It is possible to calculate the GHG emissions avoided from the

kWh figure. This system is sustainable as long as there is an entity responsible for the operation and management of the system they will have access to the data.

At this stage as the project has ended, it is impossible to foresee how will the development of new RE Project in Chad go. However, this project has set a good baseline for replicating the RE projects of this kind in Chad.

Therewith, the **aspect of monitoring of long-term changes for this project is rated HIGHLY SATISFACTORY.**

Project management

Project management has been successfully carried out by the UNIDO Project Managers (3 have changed) and Project International Experts and Project Management Unit (PMU) led by the National Project Coordinator (NPC) in Chad. The lack of availability of local co-ordination at times has resulted in more time from management in Vienna HQ (adding an extra step in overall management) which implies a lack of efficiency.

However, it has to be noted that there were three very large challenges during project implementation:

1. Lack of Government Co-Financing, which has cut the number of demonstration project sites and therewith directly affected the sustainability of the project,
2. Issues with staff on the ground that had to be trained first for the basics on Renewable Energy taken into consideration that the RE in Chad is at its dawning, and
3. Security issues within the country and the challenges of Project Staff and the main subcontractor TTA to travel to the remote sites, where exactly the Boko Haram activities are the strongest.

While the project management unit was not in charge for financial management of the project (all payments and procurement were carried out through UNIDO, or initiated by UNIDO), this aspect did not obstruct the implementation. All resources required from UNIDO were provided in a timely manner. In the light of Terminal Evaluation evidence on project management, the project can be rated as successful, taken into consideration the difficult project implementation because of the fact that three project managers have changed, and the note given is SATISFACTORY.

3.6 Assessment of processes affecting achievement of project results

3.6.1 Country ownership / drivenness

It was stated during the Terminal Evaluation and already elaborated in several sections of this Terminal Evaluation report, that the level of project ownership of the Government of Chad and local stakeholders is high. The Ministry of Petrol and Energy was the national executing partner

for the project implementation. A Project Steering Committee (PSC) consisting of representatives of government institutions and of stakeholders and beneficiaries that convened on a regular basis was of key importance for success of the project. The PCU, interviewed representatives of the Government Agencies and Ministries of Chad and public institutions, stakeholders, and private sector representatives express strong ownership of their roles within this project. The country ownership is rated HIGHLY SATISFACTORY.

3.6.2 Stakeholder involvement

Involvement of relevant stakeholders, sharing information and consultations was carried out on several levels within the Project. On a managerial and planning level, it is done within the Project Steering Committee (PSC), which is established to provide strategic guidance on the project implementation and facilitation of the coordination of various Government authorities, institutions and the industries. PSC is established with the participation of the key stakeholders and has a number of permanent members coming from numerous relevant stakeholders (Governmental institutions related to the scope of the Project). Generally, there was a high level of stakeholder involvement in the project.

The project implemented appropriate outreach and public awareness campaigns through publishing of technical evaluation reports, manuals, newspapers articles, and a short movie for promoting renewable energy in Chad. There was a positive feedback in the community for this project, as it contributes to the improvement of the quality of the living environment. The stakeholders' involvement in the project is rated HIGHLY SATISFACTORY.

3.6.3 Financial planning

Overall, the Project had appropriate financial controls, including reporting and planning, that allowed management to make informed decisions regarding the budget and allows for timely flow of funds. UNIDO managed the overall project budget and procures all services required, and as well timely prepares financial reports to the GEF, in accordance to the established UNIDO rules and regulations and applicable GEF requirements.

However, the Terminal Evaluation was not able to find financial data on financing and co-financing per project component. The only data available from the GEF Grant are according to Budget Line, and through SAP the financial data available is for 2012, 2013, 2014 and 2015.

Financial audits were not made until this stage of project implementation. All the procurements for the demonstration projects and the trainings so far went smoothly and through the HQ as centralized procurement. More on procurement will be elaborated in the section Procurement issues.

UNIDO was responsible for financing and determination of means from GEF funding and this was done in a responsible and cost-effective manner. **Financial Planning is rated SATISFACTORY.**

3.6.4 Co-financing and project outcomes and sustainability

The total indicative co-finance included in the Request for CEO Endorsement was US$ 1,801,364 divided between cash and in-kind support from UNIDO (at US$165,000) and cash support from the Government of Chad at US$ 1,636,364. A commitment letter of January 2011 from the Ministry of Petrol and Energy was included in the CEO Endorsement document committing Chad to US$ 1 million to the GEF project.

US$ 708,812.26 was received from Chad on 21 May 2010, prior to the finalisation of the project design. The rest committed US$ 1,091,211 were never provided for the project, which led to decreasing the number of project sites from five for which pre-feasibility studies were done to three pilot project sites built in Mombou, Douguia and Guelendeng.

Since the beginning of the project US$ 771,000 has been spent in co-finance, 42.8% of the total amount of co-financing foreseen has materialized.

However, additionally to the Government commitment in the Trust Fund agreement, there is also in-kind co-finance that was not included in the project design, which includes the office rental including utilities, the land for the pilot sites and significant time from the local populations at the pilot sites. It is highly recommended to account for in-kind contributions at project design in future projects.

The Co-financing and project outcomes and sustainability is rated UNSATISFACTORY.

3.6.5 Delays and project outcomes and sustainability

The project has phased a delay of eleven months. The prevised project closing date in the project document during project design was November 2014, and the project was finally closed in October 2015. The prime reason for the delay was the insecurity of whether the co-financing of the project will be provided or no. The implementation start in the PD was marked in April 2012, and the official launching of the project took place in May 2012, however the Project Coordination Unit was established much later in April 2013 when the National Project Coordinator was hired. Therewith the Mid-Term Review was postponed by twenty-one months, and took place in March 2015. The Terminal Evaluation took place only eleven months later in October 2015.

3.7 UNIDO's involvement and specific ratings

3.7.1 Preparation and readiness / Quality at entry (QAE)

As the project has started in May 2012, the project was not well prepared and ready to implement. In particular there was a lack of consistency and detail in the design of the activities so it would have been difficult to procure services against the level of detail provided in the Request for CEO Endorsement Document. A new work plan had to be proposed once the new UNIDO project manager took over. Despite this a call for the design, installation and commissioning of the five pilot sites was issued in December 2011. This should have helped with the quick start up but due to the lack of clarity in the Terms of Reference this did not speed up the process.

The counterpart resources were not in place at the start of the project, in particular the Government co-financing. The Chad government had submitted more than US$700,000 to UNIDO but US$1,091,211 was still outstanding at the project start. Shortly after the project start the Government officially committed to providing the funds in the Trust Fund agreement signed in August 2012. However these funds were never provided.

The project management was not flawless at the project start with the Project Steering Committee and PCU only being established in April 2013. This delay was partly so that it was possible to demonstrate some results at the first meeting (from the inception mission of TTA to Chad).

Primarily because of the facts that the project was not well prepared nor ready to implement at the start of the project in June 2012, project activities lacked details and consistency, counterpart resources were not in place, and project management was not in place, the **Quality at Entry and Readiness for Implementation is rated MODERATELY UNSATISFACTORY.**

3.7.2 Implementation approach

The implementation approach related to the Project complies with other approaches applied by UNIDO as it is part of Programme aimed at roll out of best renewable energy project implementation arrangement throughout the world.

Evidently, the UNIDO uses a holistic approach that focuses not only on technical improvement, but also on improvement in policy, management, operations, and financing. The approach introduces optimization of an entire energy system rather than optimization of individual equipment component. To ensure sustainability, the Project focuses on developing and promoting a well-functioning market environment that will stimulate investments in Renewable Energy in the rural areas of Chad. Thus, is provides replicability of the processes being developed and implemented within the Project.

The Project and its approach promoted local ownership and capacity building using a combination of market push via policy and normative interventions including national energy management standards, and at the same time market development through preparation of Investment Strategy for RE for Chad, delivery of trainings and capacity building.

The implementation approach by giving the Ministry of Energy and Petrol (MEP) overall project coordination responsibility through the PCU for carrying out day-to-day management, monitoring and evaluation of project activities helped to develop a strong ownership of the project, which led to an overall satisfactory project implementation given the very difficult circumstances, together with the committed support from UNIDO's Project Managers. Flexible management has been demonstrated by amendments to project design in line with country needs and resources available. Especially it has to be pinpointed that this was the exemplary project where the Mid-

Term Review of the project was used as a full steering instrument, with a complete re-design of the project results framework due to the lack of the government co-financing.

Use of a large sub-contract with TTA and ADER has been efficient and was necessary given the difficult security, financial and possibilities to do business situation in Chad.

Activities and outputs have been adapted to new situations by more specific requirements from Ministry of Energy and Petrol has led the design of activities relating to the regulatory and institutional framework and training needs.

Component 3 was re-designed as a two staged approach to take into account risk of non-receipt of Government co-finance, out of which only first stage with three demonstration pilot projects was implemented instead of the planned five demonstration project.

In view of the above, the Implementation Approach is rated SATISFACTORY (S).

3.7.3 UNIDO's supervision and backstopping

UNIDO staff provides quality support and advice to the project coming from different UNIDO HQ departments and also hired international consultants bringing the best available knowledge and practice, providing the right staffing levels, continuity and frequency of field visits for the project, identifying problems in a timely manner and providing appropriate response. The rating for UNIDO's supervision and backstopping is primarily based on regular presence of the three Project Managers from IA in the country at crucial times of project implementation despite the real security threats and difficulties to travel. It must be noted that the Project Managers did provide regular and dedicated in-country assistance to the PCU, especially in the time of the actual implementation of the demonstration projects. The late establishment of the PCU, and the insecurity of the government co-financing, and therewith the insecurity whether three or five pilot project will be implemented led to the project delay of totally eleven months. Consequently, the MTR was carried out twenty-one months later, and the Terminal Evaluation eleven month later than planned.

UNIDO supervision and backstopping is rated Satisfactory (S), because during the assessment of UNIDO's supervision and backstopping prevailed the dedicated contribution of the UNIDO project managers (three PMs were changed during the project), UNIDO Project International Experts, as the project success was due to UNIDO's dedicated teamwork and support to the PCU.

3.8 Project coordination and management

Overall, during project implementation the project management has been effective and efficient. UNIDO had clear roles and responsibilities for the HQs and PCU and are adequately resourced for their project management. With this management structure they have started to fulfil their goals in line with those set out in the results framework, although slightly behind schedule. The

use of one large sub-contract is also an efficient use of resources and moves some of the risk of implementation to the sub-contractor, TTA. Subcontracts have been used for the implementation of the three demonstration projects to TTA from Spain, and to the ADER for conducting some project activities as needed.

Communication gaps were present between the PCU and Vienna HQs. This lack of availability of local co-ordination at times has resulted in more Vienna HQs management time in phone calls and chasing up (adding an extra step in overall management) which implies a lack of efficiency. It is difficult to know how to remedy this situation when the appointment of the national project co-ordinator is political and was proposed by the MPE, and is a MPE staff member. This has meant that consultation with the Government counter-part and with local communities has been very efficient but other elements of reporting and monitoring have been lacking. Related to this appointment it is unclear where the project co-ordinator's priorities lie, between UNIDO and the Government, which could be responsible for difficult management at times. Also it has to be noted that once the first National Project Coordinator was appointed a function at ADER, the Project Assistant overtook the role of the NPC, which was not very effective.

If significant issues were raised, for example co-finance issues or decisions on distribution lines, these must be resolved from UNIDO HQs which can be difficult at a distance and is not an efficient method.

The rating for Project Coordination and Management is SATISFACTORY.

3.9 Assessment of gender mainstreaming

Gender was not considered at all in the project design.

This part should include an assessment of the extent to which socio-economic benefits delivered by the project include consideration of gender dimensions. This has been assessed through interviews and desk review of reporting of the gender balance in beneficiaries and the perception of gender balance, as well as the extent to which gender was considered during the design and implementation of the project.

At the mini-grid pilot sites TTA have conscientiously included women at all stages of the project, as far as possible. Consultation was carried out with the existing women's associations and lending groups. At times it has been difficult since men are more visible and make all the decisions within the communities. The design specifically included consultation with women and their energy needs and the Local Associations each include a Women's representative. The Local Association in Mombou has 2 women out of 6 members; one the Women's representative.

Even at project closure, it is still too early to see the impact specifically on women at Mombou. Everyone benefits from the reduced costs of mobile charging and better lighting. The women's representative, when asked, said that the light and phone charging was nice and allowed for more time to gossip and meet in the light. This allowed for more time to discuss ideas but it is not possible to develop these ideas without further means such as finance and training.

In other activities there has not been any specific targeting. One woman, an intern from ADER, was included in the Homer training (out of 35). Although this number is low it is clear that there are few women employed in the target organizations.

However, on the training that took place on 19 October 2015 on Renewable energies, co-organized by ECREE, there was a higher rate of women participation with five women that were trained out of 44.

Examples of women being beneficiaries with concrete employment activities were noticed only on the pilot site of Douguia, where 12 out of 56 beneficiaries are women that utilize the electrical energy produced by the solar installations for refrigerating the drinks that they are selling in their shops, or for handling their fish businesses.

3.10 Overall ratings

The evaluation team rated the project performance as required by GEF and UNIDO Evaluation Policies and Guidelines for conducting Evaluations. This subchapter summarizes the ratings according to the evaluation criteria given in the ToR: Attainment of Project Objectives and Results, Sustainability of Project Outcomes, Monitoring and Evaluation, and UNIDO specific ratings as specified in Annex A (ToR). The ratings are presented in separate tables from 11 to 14, one for each of the categories rated separately and with brief justifications for the rating based on the findings of the main analysis. The overall rating for the project is given in the last table (table 15). The rating system that was applied for each of the criteria is specified in Annex A of this report, as part of the ToR for this Terminal Evaluation.

Table 11 Criterion - Attainment of project objectives and results

Criterion	Evaluator's Summary Comments	Evaluator's Rating
Attainment of project objectives and results (overall rating)	No shortcomings were evidenced by the evaluation.	**S**
Design (The extent to which the project is relevant to local and national environmental priorities and policies and global environmental benefits and how this relevance is changing over time)	The overall project design is relevant, however the baseline was not correct in the original Project Document and therewith the project design was poor and insufficient. The Project Results Framework with its outcomes and outputs, as well as target indicators were not developed adequately (having the measurable element of being a SMART indicator) and they did not allow for proper adaptive management and monitoring of project results. Therefore, at time of the mid-term review, amendments to design have been carried out to: be in line with country needs and resources available, take into account the situation with the co-finance, and be more realistic of what is feasible to be implemented for the given period of time with the given amount of finances.	MU
Effectiveness (The extent to which project's objectives have been achieved or how likely they are to be achieved)	Project effectiveness is satisfactory in the light of overall satisfactory project finalisation and implementation. Main outputs achieved by the time of the TE are: For the PC1: Institutional, political and financial mechanisms, the outputs have not been delivered yet, as the institutional framework to allow private sector operation is still not in place. Achievement is the creation of ADER (Chadian Renewable Energy Agency). Draft Document on Electrification Policy and Law on Renewable Energy exist, however they have not yet been amended and passed by the Government. For the PC2, detailed feasibility studies for mini solar grids have been prepared for five sites and diverse technical trainings have been delivered to 109 stakeholders on renewable energy, and technical maintenance. For the PC3 – the demonstration pilot project and creation of conditions for sensibilisation on photovoltaic technologies, three solar PV stations have been constructed with a total capacity of 121.7 kWc and 213 connections.	S
Relevance (The extent to which the project is relevant to local and national environmental priorities and policies and global environmental benefits and how this relevance is changing over time)	The project is fully relevant to UNIDO and to the national energy priorities, policies and strategy of the Government of Chad. Moreover, the project is fully relevant to the GEF focal area of climate change and SP3 - Promoting market approaches to renewable energy.	S

Criterion	Evaluator's Summary Comments	Evaluator's Rating
Efficiency (The extent to which results have been delivered with the least costly resources possible)	Project efficiency is moderately satisfactory as efforts were undertaken to ensure cost-effectiveness (Efficiency of results delivered) of project implementation. The final tranche of co-finance promised and committed by the government has not been delivered, which caused that the project did not reach the overall impact as planned in the original project document. Materialized co-financing by the Government amounted to 771,000 USD (cash and in-kind) instead of the planned 1.636 mill. USD in the original Project Document. Activities with some of the trainings and the three demonstration projects were behind schedule, but fully completed for the three sites in June 2015, yet the Document on Electrification Policy and Law on Renewable Energy has not been passed yet by the Government. The perception of cost-effectiveness is very good. TTA, ECREE and ADER have delivered much more than in their Terms of Reference.	MS

Table 12 Criterion - Sustainability of project outcomes

Criterion	Evaluator's Summary Comments	Evaluator's Rating
Sustainability of Project outcomes (overall rating)	The likely ability of an intervention to continue to deliver benefits for an extended period of time after the project's completion	**MU**
Financial risks	There are significant financial risks to sustainability: Financial risks associated with the sustainability at each demonstration site are there. If the revenues are unable to cover the costs of management and future equipment replacement, the sustainability becomes questionable. The lack of co-finance limited the number of sites to three instead of five as planned originally in the Project Document. Three sites may not be profitable enough for a private sector operator to take on the maintenance. There is a strong oil lobby in the country which affects the allocation of finance and could reduce/divert money from renewable energy. Technical risks related to problems at demonstration sites (for example problems with the instability of the underground cables) affect the revenues and ability to convince government to commit resources.	MU
Socio-political risks	There are moderate risks at the time being that affect socio-political sustainability, which might continue affecting the sustainability of the project in the future (insufficient public stakeholders awareness of RE). The fact that the number of systems affects the viability of the RE concept brings moderate risks at the time being that affect socio-political sustainability, which might continue affecting the sustainability of the project in the future after the project ends.	ML

Institutional framework and governance risks	There are significant risks that affect institutional framework and governance sustainability as institutional framework to allow private sector operation is still not in place (even though a Draft Document on Electrification Policy and Law on Renewable Energy exists, it has to be amended to the Country needs accordingly and subsequently passed by the Government).	MU
Environmental risks	There are no identified potential risks to environmental sustainability.	L

Table 13 Criterion - Monitoring and evaluation

Criterion	Evaluator's Summary Comments	Evaluator's Rating
Monitoring and Evaluation (overall rating) Sub criteria (below)	The Extent to which the project M&E was appropriate and functioning was rather low as it did not meet the minimum GEF requirements for M&E. On the other had, the project had a functioning M&E System, which was not used systematically together with the results framework.	**MS**
M&E Design	M&E design included the Project Results Framework which includes some SMART indicators at outcome level. However no indicators were provided for outputs, not all targets provided were consistent with the activities described and the baseline is not provided for all the targets. Did not meet GEF Minimum Requirements for M&E.	U
M&E Plan Implementation (use for adaptive management)	Project had a functioning M&E system but was not systematic and the results framework was not used. An updated M&E plan was produced with further indicators covering the project with just Phase 1 of Component 3. No indicators included for more detailed outputs or outcomes. It was not clear how frequently it is up-dated nor how it informs further work or management. Annual reporting on PIR correctly carried out at outcome level. Each demonstration site includes for monitoring of kWh (and so for GHG avoided).	MS
Budgeting and Funding for M&E activities	The budget provided for M&E at the planning stage was sufficient. Adequate funding has been provided for M&E activities during the project implementation, and the necessary monitoring activities have been undertaken.	HS

Project Management	Project management has been successfully carried out by the UNIDO Project Managers (3 have changed) and Project International Experts and Project Management Unit (PMU) led by the National Project Coordinator (NPC) in Chad. The lack of availability of local co-ordination at times has resulted in more time from management in Vienna HQ (adding an extra step in overall management) which implies a lack of efficiency.	S

Table 14 Criterion - UNIDO specific ratings and overall rating

Criterion	Evaluator's Summary Comments	Evaluator's Rating
UNIDO specific ratings	Efficiency and effectiveness of the implementation and project management approach	**S**
Quality at entry / Preparation and readiness	The project was nor well prepared nor ready to implement at the start of the project in June 2012. Project activities lacked details and consistency. Counterpart resources were not in place as only part of the committed co-financing was available. Project management was not in place.	MU
Implementation approach	The implementation approach by giving the Ministry of Energy and Petrol (MEP) overall project coordination responsibility through the PCU for carrying out day-to-day management, monitoring and evaluation of project activities helped to develop a strong ownership of the project, which led to an overall satisfactory project implementation given the very difficult circumstances, together with the committed support from UNIDO's Project Managers. Flexible management has been demonstrated by amendments to project design in line with country needs and resources available. Use of a large sub-contract with TTA and ADER has been efficient and was necessary given the difficult security, financial and possibilities to do business situation in Chad. Activities and outputs have been adapted to new situations by more specific requirements from Ministry of Energy and Petrol has led the design of activities relating to the regulatory and institutional framework and training needs.. Component 3 was re-designed as a two staged approach to take into account risk of non-receipt of Government co-finance, out of which only first stage with three demonstration pilot projects was implemented.	S
UNIDO Supervision and backstopping	During assessment of UNIDO's supervision and backstopping prevailed the dedicated contribution of the UNIDO project managers (3 PMs were changed during the project), UNIDO Project International Experts, as the project success was due to UNIDO's dedicated teamwork and support to the PCU.	S
Overall Rating		**S**

Table 15 Overall ratings for the project

Criterion	Evaluator's Rating
Attainment of project objectives and results (overall rating) Sub criteria (below)	**S**
Design	**MU**
Effectiveness	**S**
Relevance	**HS**
Efficiency	**MS**
Sustainability of Project outcomes (overall rating) Sub criteria (below)	**MU**
Financial risks	**ML**
Sociopolitical risks	**MU**
Institutional framework and governance risks	**MU**
Environmental risks	**L**
Monitoring and Evaluation (overall rating) Sub criteria (below)	**MS**
M&E Design	**U**
M&E Plan Implementation (use for adaptive management)	**MS**
Budgeting and Funding for M&E activities	**HS**
Project Management	**S**
UNIDO specific ratings	**S**
Quality at entry / Preparation and readiness	**MU**
Implementation approach	**S**
UNIDO Supervision and backstopping	**S**
Overall Rating	**S**

RATING FOR ATTAINMENT OF PROJECT OBJECTIVES AND RESULTS

Highly Satisfactory (HS):	The project had no shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
Satisfactory (S):	The project had minor shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
Moderately Satisfactory (MS):	The project had moderate shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
Moderately Unsatisfactory (MU):	The project had significant shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Unsatisfactory (U):	The project had major shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
Highly Unsatisfactory (HU):	The project had severe shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

RATINGS ON SUSTAINABILITY

Likely (L)	There are no risks affecting this dimension of sustainability.
Moderately Likely (ML):	There are moderate risks that affect this dimension of sustainability.
Moderately Unlikely (MU):	There are significant risks that affect this dimension of sustainability.
Unlikely (U):	There are severe risks that affect this dimension of sustainability.

RATINGS OF PROJECT M&E

Highly Satisfactory (HS):	There were no shortcomings in the project M&E system.
Satisfactory (S):	There were minor shortcomings in the project M&E system.
Moderately Satisfactory (MS):	There were moderate shortcomings in the project M&E system.
Moderately Unsatisfactory (MU):	There were significant shortcomings in the project M&E system.
Unsatisfactory (U):	There were major shortcomings in the project M&E system.
Highly Unsatisfactory (HU):	The Project had no M&E system.

ALL OTHER RATINGS

HS	**= Highly Satisfactory**	Excellent
S	**= Satisfactory**	Well above average
MS	**= Moderately Satisfactory**	Average
MU	**= Moderately Unsatisfactory**	Below average
U	**= Unsatisfactory**	Poor
HU	**= Highly Unsatisfactory**	Very poor (Appalling)

4. Conclusions, recommendations and lessons learned

4.1 Conclusions

The overall Satisfactory rating of the project results from the fact that Project Relevance was highly satisfactory as Renewable Energy is one of the priorities of the Chadian Government, and the good project implementation taking into consideration the extreme difficulties in working with conditions under low security level, lack of government co-financing, issues with staff on the ground and less developed business environment, where private sector in the Renewable Energies field is at its dawning. The project management has displayed flexibility by re-designing the project where, at the time of the mid-term review, project modifications and amendments have made the project more coherent with achieving overall satisfactory results.

The viability of a proposed renewable energy enterprise model depends on the sufficient number of renewable energy mini-grids able to assure a sustainable investment strategy in order to enable the private sector to exploit these systems. Without a clear government engagement and support of multiplication of these Renewable Energy systems, the long-term viability and sustainability of this project is limited.

The project has avoided Green House Gases emissions and increased electricity access in Chad as planned in the Project Document and as the same were corrected during the Mid-Term Review due to the lack of the co-financing.

The general objectives as previsied in the original Project Document have not been met as a result of the insufficiently mobilised Government co-financing. However, majority of the project objectives as in the corrected Project Results Framework have been met. Overall, the project has been effective, with the main outputs planned being achieved by the time of the Terminal Evaluation: detailed feasibility studies for mini solar grids have been prepared for five sites and diverse technical trainings have been delivered to 109 stakeholders on renewable energy, and technical maintenance, three solar photovoltaic stations have been constructed with a total capacity of 121.7 kWc and 213 connections. Yet, some outputs from the institutional, political and financial mechanisms have not been delivered, as the institutional framework to allow private sector operation is still not in place, and the draft document on Electrification Policy and Law on Renewable Energy exist, however they have not yet been amended and passed by the Government. On the other hand, ADER (Chadian Renewable Energy Agency) is being created.

The project was moderately efficient, as efforts were undertaken to ensure cost-effectiveness, and therewith efficiency of results delivered during project implementation. The final tranche of co-finance promised and committed by the government has not been delivered, which caused that the project did not reach the overall impact as planned in the original project document. Materialized co-financing amounted to 771,000 USD (cash and in-kind) instead of the planned 1.8 mill. USD in the original Project Document. Activities with some of the trainings and the

three demonstration projects were behind schedule, but fully completed for the three sites in June 2015.

The original project concept includes numerous inconsistencies, an inadequate Monitoring and Evaluation framework and unrealistic objectives. The sustainability of project results was affected by the lack of co-financing as planned in the original Project Document. As already mentioned under efficiency, the document for the policy of electrification in Chad and the Electrification Law should be adopted and passed by the Chadian Government as soon as possible.

The project is fully relevant to UNIDO and to the national energy priorities, policies and strategy of the Government of the Chad, as well as to the GEF focal area of climate change and SP3 - Promoting market approaches to renewable energy.

Finally, the project has a clear value added and potential for replicability: the European Union has recently offered UNIDO to collaborate within a project financed by the EU and implemented by the Chadian Ministry of Energy and Petrol on World Alliance against the Climate Change.

4.2 Recommendations

Based on the terminal evaluation and findings of this report, the evaluation team prepared several recommendations that can contribute to the reduction of GHG emissions through promotion of renewable energy based rural mini-grids for productive uses and energy access in Chad in the future after termination of this project. The recommendations designees are the Government of the Chad and for UNIDO.

The following recommendations can be given UNIDO:

1. The project should be transferred and owned by ADER (Chadian Renewable Energy Development Agency) as a fundamental condition for the best follow-up of the solar installations and project sustainability.
2. For future projects, greater level of detail and study is required at the Project Preparation Grant (PPG) stage in order to create a strong project baseline.
3. In remote undeveloped areas a more holistic approach is needed to ensure delivery of all the potential impacts – for example electricity alone will not develop productive activities if there is also a need for awareness raising and micro-finance to set up businesses.

The following recommendations can be given to the Government of Chad:

4. ADER and the Ministry of Energy and Petrol should ensure to continue reinforcing the local technical capacities, which will allow the most efficient maintenance of the solar mini-grids.

5. Training for technical failures and malfunctioning should be organized by ADER, which will allow to share intervention responsibilities between the local technical team and a technical team based in N'Djaména.
6. The Chadian Government should consider the feasibility of encouraging Public-Private initiatives for operating with RE mini-grids after the departure of TTA.
7. The Chadian Government should accelerate the processes of validation and passing of the Law on National Strategy of Electrification, including the Business Plan for Renewable Energies as well as the Renewable Energy Law.
8. ADER and the Ministry of Petrol and Energy should rapidly examine the Draft of the Document of Cabinet Sylvanus and propose necessary amendments for its finalization. Both should organize a meeting of the main stakeholders in the process of finalization of the Renewable Energy Law on Electrification and the Code.
9. The Chadian Government should be sensitized to undertake public awareness activities, and take advantages of renewable energies based on the pilot project sites already constructed and functioning (Mombou, Douguia and Guelendeng).
10. Seek co-financing from donors for funding for implementation of new Renewable Energies projects in Chad (replication of pilot projects).

4.3 Lessons learned

The following lessons were learned from the implementation of this project:

- Clear communication is very important to manage expectations and avoid future misunderstandings during project implementation.
- Realistic timing and a thorough understanding of the challenges to doing business in the target country should always be allowed for.
- Project start-up time should be built in into project design in order to avoid project delays.
- In-kind co-finance should be included as a form of co-financing in the Project Document with activities listed in the in-kind co-finance already there (for instance: office space, lending personnel etc.), and one should be realistic about country's ability to commit cash and in-kind form of co-financing altogether.
- Co-finance should be ensured and available at the start of the project.
- Providing of co-financing from the private sector should be ensured at the beginning of the project.
- Flexible management is required to finish project implementation and allowed the project to be flexible and to finish implementation even with lack of co-financing.
- A Mid-term review is of utmost importance as a tool to steer the project in the right direction, especially if unexpected situations that ought to be corrected appear during project implementation (lack of major co-financing, Ebola etc.).

Annex A: Terms of reference

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

TERMS OF REFERENCE

Independent terminal evaluation of UNIDO project:

SPWA-CC: Promoting Renewable Energy Based Mini-Grids for Rural Electrification and Productive Uses in Chad

UNIDO Project numbers: GFCHD12001
UNIDO SAP ID: 100184
GEF Project number: 3959

MAY 2015

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I. Project background and overview

1. Project factsheet

Project Title	***SPWA-CC: Promoting Renewable Energy Based Mini-Grids for Rural Electrification and Productive Uses***
GEF ID	**3959**
UNIDO project No. (SAP ID)	**100184**
Region	**Africa**
Country(ies)	**Chad**
GEF Focal area(s) and operational programme	**Climate Change** **CC-3; CC-4**
GEF Agencies (implementing agency)	**UNIDO**
Project executing partners	**Ministry of Mines and Energy**
Project size (FSP, MSP, EA)	**FSP**
Project CEO endorsement/Approval date	**11 May 2012**
Project implementation start date (PAD issuance date)	**05 June 2012**
Original expected implementation end date **(indicated in CEO endorsement/Approval document)**	**01 November 2014**
Revised expected implementation end date (if any)	**31 October 2015**
Actual implementation end date	
GEF Grant (USD)	**1,758,182**
GEF PPG (USD) (if any)	**60,000**
UNIDO inputs (USD)	**60,000 (cash)**
Co-financing (USD) at CEO Endorsement	**1,801,364 (cash+In-kind)**
Total project cost (USD) **(GEF Grant + Co-financing at CEO Endorsement)**	**3,619,546**
Mid-term review date	**December 2014 – January 2015**
Planned terminal evaluation date	**September – October 2015**

Source: Project document

2. Project summary

Chad is located in Central Africa, south of Libya. It borders Cameroon, Central African Republic, Libya, Niger, Nigeria and Sudan and is the largest of Africa's 16 landlocked countries. It has a population of around 11.4 million (2014), with almost 93% of the population below 55 years of age (65% of the population being below 25 years of age). Population growth rate is at 1.92% (2014). Literacy rate of total population is 37.3%. Over 60% of the population lives below the poverty line (2011; in 2001, it was 80%), and relies on subsistence farming and livestock raising for their livelihood. Unemployment rate is 7.8%; youth unemployment has remained between 10-11% since 1995.

Chad has a GDP of USD 15.84 billion (official exchange rate, 2014) and a GDP real growth rate of 9.6% (2014; 2013: 3.9%; 2012: 8.9%). Chad's economy is predominantly agriculture based, with the agriculture sector constituting the highest share of GDP with 54.3%, followed by services with 32.4% and industry with 13.2%. Agricultural products are plenty, such as cotton, sorghum, millet, peanuts, rice, potatoes, cassava (manioc, tapioca), and livestock (cattle, sheep, goats, camels). Industries are in the following sectors: oil, cotton textiles, meatpacking, brewing, natron (sodium carbonate), soap, cigarettes, construction materials. Growth rate of industrial production is estimated to be at 6% (2014).

Current environmental issues are inadequate supplies of potable water, improper waste disposal in rural areas contributes to soil and water pollution, desertification. Chad is party to some international environmental agreements, such as Biodiversity, Climate Change, Desertification, Endangered Species, Hazardous Wastes, Ozone Layer Protection, Wetlands.

As far as energy consumption is concerned, the Republic of Chad, like many low income countries, faces the dual challenge of (i) increasing the access to modern energy needed for the economic development and social stability of its population who have no access to electricity and are dependent almost wholly on biomass fuels for energy services, and (ii) having access to the finance required to develop a low carbon sustainable economy. Access to modern energy services can be gained either by increasing the country's own generation capacity and extending the national grid to all areas, or by establishing decentralized mini-grids.

The establishment of viable and functional renewable energy-powered decentralised mini grids in rural areas faces a number of barriers, some of which are specific to mini-grids and some of which are specific to the use of renewable energy to power mini-grids. Some of these barriers which need to be overcome are as follows:

- Lack of legal and regulatory framework;
- Lack of information on available renewable energy resources;
- Lack of technical capacities and appreaciation of technical feasibility and commercial viability of renewable energy;
- Lack of access to capital and the need to engage public and private sector.

The project aims to reduce the institutional, technical and financial barriers so that a better understanding of the potentials of renewable energy resources is achieved and sustainable pathways to valorizing these resources are promoted with the involvement of the private sector. Moreover, it aims at promoting renewable energies based mini-grids in order to increase the rate of access of the peri-urban and rural populations to electricity and replacing fossil energies. The approach is to combine substantial capacity building and learning-by-doing with technical assistance interventions at the policy and demonstration project level. Primary target beneficiaries of the project are energy policy-making and implementing institutions, primarily the Ministry of Oil and Energy and Directorate of Energy, potential energy generators

(managers and engineers), rural energy users, training institutes, energy professionals and service providers and the financial sector.

Project implementation started in June 2012 and the initial project end date was in November 2014. The same was revised to October 2015.

An independent MTR was carried out by an international evaluator as well as a national evaluator from December 2014 – January 2015 (MTR report March 2015), and included a field mission to Chad from 20-27 January 2015. The TE is scheduled to take place from September – October 2015.

3. Project objective

The project is expected to remove the institutional, technical, knowledge and awareness-related barriers to the promotion of a market approach for the development of mini-grid connected renewable energy systems to meet the growing need for access to electricity in rural areas, which is currently met or likely to be met by fossil fuels.

The project consists of **3 main components**, besides the M&E component as well as project management.

Project Component 1 (PC-1): Institutional, financial, policy and regulatory framework: create an enabling environment for wide scale replication of renewable energy generation for rural electrification, thereby displacing dependence on fossil and wood fuels and reducing GHG emissions as a result. Develop a package of investment incentives, standardised PPAs, tariffs, pricing mechanisms, risk management instruments and renewable energy based rural mini grids business models to help enhance investor interest and confidence.

Project Component 2 (PC-2): Assist private developers with feasibilty studies: improve existing information and data on renewable energy potential sites by preparing pre-feasibility studies on a number of sites and indicating parameters related to their generation potentials, socio economic profiles of beneficiaries, estimated costs.

Project Component 3 (PC-3): Technology demonstration and creation of awareness and technical capacities development: Demonstrate the technical and economic feasibility of the photovoltaic based mini grids and using the process for on job training and the creation of technical capacities.

4. Relevant project reports/documents

Mid-term Review

An independent MTR was carried out by an international evaluator as well as a national evaluator from December 2014 – January 2015 (MTR report March 2015), and included a field mission to Chad from 20-27 January 2015. The overall rating for the project was “Moderately Satisfactory”. Some of the key findings of the review are as follows:

Project Design: The original project design is still relevant to the country context and addresses key needs and market barriers to renewable energy and rural electrification in Chad. The main weakness in the project was in the initial project design which was inconsistent and not well prepared so the project was not ready to implement at the start of the project in June 2012. Amendments were made to the project design and since then the project management and progress have been satisfactory.

Effectiveness: satisfactory

Overall, the Project was on the right track and had made noticeable progress towards expected outputs and outcomes, but was significantly behind the original schedule.

Efficiency: Although activities were behind schedule, the MTR team considered that an appropriate balance between impact and resources had been achieved, and the project was being efficiently implemented.

Monitoring and evaluation: moderately satisfactory

No M&E plan was prepared at the outset and the Results Framework was weak.

Implementation and Management: satisfactory

There was a lack of consistency and detail in the design of the activities so it would have been difficult to procure services against the level of detail provided in the RCE.

Sustainability: moderately unlikely

A number of significant risks associated with the sustainability of the mini-grids, particularly financial risks due to the reduced revenues being collected at site (at Mombou) were identified, which means that there are not enough funds to cover the cost of future replacements.

Lessons learned highlighted the significance of detail during the PPG stage, as well as the importance of ensuring co-finance at project start. A revised project results framework was also proposed. Further details can be referred to in the MTR report (March 2015).

5. Project implementation arrangements

UNIDO: is the Implementing Agency (IA) of the project

Project Coordination Unit (PCU): within the Directorate of Energy of the Ministry of Oil and Energy. Responsible for the overall day to day coordination and supervision of field activities, including effective linkages between the project and the beneficiaries and other on-going programs, ensuring an effective monitoring and evaluation system of all activities.

National Project Coordinator (NPC): will be in the PCU.

Project Steering Committee (PSC): constituted by representatives of main stakeholders, to, inter alia, advise the project on strategic directions of support activities to be provided.

6. Budget information

The project is funded through a GEF grant, amounting to USD 1,758,182 (and PPG Grant of USD 60,000), a UNIDO contribution of USD 60,000 (cash); and the counterparts' co-financing of USD 4,040,000 (cash and in kind), which amount to total project budget of USD 5,918,182.

	Project Preparation	***Project***	***Total***
GEF financing	60,000	1,758,182	1,818,182
Co-financing (Cash and In-kind)		4,100,000	4,100,000
Total ($)	**60,000**	**5,858,182**	**5,918,182**

Source: PIF

Project outcomes	GEF ($)	Co-Financing ($)	Total ($)
1. Institutional, policy and legal framework	150,000	250,000	**400,000**
2. Mapping of RE resource endownment and identification of specific RE sites	100,000	300,000	**400,000**
3. Renewable energy based mini-grids for productive uses	1,246,000	3,000,000	**4,246,000**
4. Capacity building for scaling up of RE based mini-grids	150,000	250,000	**400,000**
Project Management	118,000	300,000	**418,000**
Total ($)	**1,764,000**	**4,100,000**	**5,864,000**

Source: PIF

Co-financing Source Breakdown is as follows:

Name of Co-financier (source)	Classification	Type	Total Amount ($)
National Government	Government	Cash	800,000
UNIDO	IA	Cash	60,000
Multilateral Agencies	Others	Cash	1,900,000
Private Sector	Private sector	Cash	1,340,000
Total Co-Financing ($)			**4,100,000**

Source: PIF

UNIDO budget execution:

Item	EXECUTED BUDGET in 2012	EXECUTED BUDGET in 2013	EXECUTED BUDGET in 2014	EXECUTED BUDGET in 2015	Total Expenditure ($) (2012-present) (08 May 2015)
Contractual Services	1,200,000.02	411,066.15	37,952.50	145,678.00	**1,794,696.67**
Equipment		38,299.10	-718.84	3,850.08	**41,430.34**
Internat. Cons/Staff			51,404.74	50,326.77	**101,731.51**
Local Travel		1,092.07	14,751.43	11,166.93	**27,010.43**
Nat. Consult./Staff	2,551.88	17,480.48	72,793.24	38,615.33	**131,440.93**
Other Direct Costs	100.16	48.76	8,019.88	5,868.96	**14,037.76**
Premises		431.98	29.60	29.60	**491.18**
Staff Travel	1,650.95	10,129.03	8,786.27	4,877.03	**25,443.28**
Train/Fellowsh/Study			37,391.31	-4,148.72	**33,242.59**
Total ($)	**1,204,303.01**	**478,547.57**	**230,410.13**	**256,263.98**	**2,169,524.69**

Source: SAP database, 08 May 2015.

II. Scope and purpose of the evaluation

The terminal evaluation (TE) will cover the whole duration of the project from its starting date in June 2012 to the estimated completion date in October 2015. It will assess project performance against the evaluation criteria: relevance, effectiveness, efficiency, sustainability and impact.

The TE should provide an analysis of the attainment of the project objective(s) and the 3 technical components. Through its assessments, the ET should enable the Government, counterparts, the GEF, UNIDO and other stakeholders and donors to verify prospects for development impact and sustainability, providing an analysis of the attainment of global environmental objectives, project objectives, delivery and completion of project outputs/activities, and outcomes/impacts based on indicators. The assessment includes re-examination of the relevance of the objectives and other elements of project design according to the project evaluation parameters defined in chapter VI.

The TE has an additional purpose of drawing lessons and developing recommendations for UNIDO and the GEF that may help for improving the selection, enhancing the design and implementation of similar future projects and activities in the country and on a global scale upon project completion. The TE report should include examples of good practices for other projects in the focal area, country, or region.

The key question of the TE is whether the project has achieved or is likely to achieve its main objective of avoiding greenhouse gas emissions by promoting renewable energy technologies for mini-grid rural electrification for productive uses in Chad; and removing the institutional, technical, knowledge and awareness-related barriers to the promotion of a market approach for the development of mini-grid connected renewable energy systems to meet the growing need for access to electricity in rural areas, which is currently met or likely to be met by fossil fuels.

III. Evaluation approach and methodology

The TE will be conducted in accordance with the UNIDO Evaluation Policy, the UNIDO Guidelines for the Technical Cooperation Programmes and Projects, the GEF's 2008 Guidelines for Implementing and Executing Agencies to Conduct Terminal Evaluations, the GEF Monitoring and Evaluation Policy from 2010 and the Recommended Minimum Fiduciary Standards for GEF Implementing and Executing Agencies.

It will be carried out as an independent in-depth evaluation using a participatory approach whereby all key parties associated with the project are kept informed and regularly consulted throughout the evaluation. The evaluation team leader will liaise with the UNIDO Office for Independent Evaluation (ODG/EVA) on the conduct of the evaluation and methodological issues.

The ET will be required to use different methods to ensure that data gathering and analysis deliver evidence-based qualitative and quantitative information, based on diverse sources, as necessary: desk studies and literature review, statistical analysis, individual interviews, focus group meetings, surveys and direct observation. This approach will not only enable the evaluation to assess causality through quantitative means but also to provide reasons for why certain results were achieved or not and to triangulate information for higher reliability of findings. The specific mixed methodological approach will be described in the inception report.

The ET will develop interview guidelines. Field interviews can take place either in the form of focus-group discussions or one-to-one consultations.

The methodology will be based on the following:

7. A desk review of project documents, including, but not limited to:

(a) The original project document, monitoring reports (such as progress and financial reports to UNIDO and GEF annual Project Implementation Review (PIR) reports), Terminal Evaluation/review report, output reports (case studies, action plans, sub-regional strategies, etc.), BTOMR, end-of-contract report and relevant correspondence.

(b) Notes from the meetings of committees involved in the project (e.g. approval and steering committees).

(c) Other project-related material produced by the project.

8. The evaluation team will use available models of (or reconstruct if necessary) theory of change for the different types of intervention (enabling, capacity, investment, demonstration). The validity of the theory of change will be examined through specific questions in interviews and possibly through a survey of stakeholders.

9. Counterfactual information: In those cases where baseline information for relevant indicators is not available, the evaluation team will aim at establishing a proxy-baseline through recall and secondary information.

10. Interviews with project management and technical support including staff and management at UNIDO HQ and in the field and – if necessary - staff associated with the project's financial administration and procurement.

11. Interviews with project partners including Government counterparts, GEF focal points and partners that have been selected for co-financing as shown in the corresponding sections of the project documents.

12. On-site observation of results achieved in demonstration projects, including interviews of actual and potential beneficiaries of improved technologies.

13. Interviews and telephone interviews with intended users for the project outputs and other stakeholders involved with the project. The evaluation team shall determine whether to seek additional information and opinions from representatives of any donor agencies or other organisations.

14. Interviews with the relevant UNIDO Field Office and the project's management members and the various national and sub-regional authorities dealing with project activities as necessary. If deemed necessary, the evaluation team shall also gain broader perspectives from discussions with relevant GEF Secretariat staff.

15. Other interviews, surveys or document reviews as deemed necessary by the evaluation team and/or UNIDO ODG/EVA.

16. The inception report will provide details on the methodology used by the evaluation team and include an evaluation matrix.

IV. Evaluation team composition

The evaluation team will be composed of one international evaluation consultant acting as a team leader and one national evaluation consultant.

The ET should be able to provide information relevant for follow-up studies, including evaluation verification on request to the GEF partnership up to two years after completion of the evaluation.

Both consultants will be contracted by UNIDO. The tasks of each team member are specified in the job descriptions attached to these terms of reference.

Members of the evaluation team must not have been directly involved in the design and/or implementation of the programme/projects.

The Project Manager at UNIDO and the Project Team in Chad will support the evaluation team. The UNIDO GEF Coordinator and GEF OFPs will be briefed on the evaluation and equally provide support to its conduct.

V. Time schedule and deliverables

The evaluation is scheduled to take place in the period from September 2015 to October 2015. The field mission is planned for 20-26 September 2015. At the end of the field mission, there will be a presentation of the preliminary findings for all stakeholders involved in this project in Chad.

After the field mission, the evaluation team leader will come to UNIDO HQ for debriefing and presentation of the preliminary findings of the Terminal Evaluation. The draft TE report will be submitted 4-6 weeks after the end of the mission.

VI. Project evaluation parameters

The evaluation team will rate the projects. The ***ratings for the parameters described in the following sub-chapters A to J will be presented in the form of a table*** with each of the categories rated separately and with **brief justifications for the rating** based on the findings of the main analysis. An overall rating for the project should also be given.

A. Project design

The evaluation will examine the extent to which:

- the project's design is adequate to address the problems at hand;
- a participatory project identification process was instrumental in selecting problem areas and national counterparts;
- the project has a clear thematically focused development objective, the attainment of which can be determined by a set of verifiable indicators;
- the project was formulated based on the logical framework (project results framework) approach;
- the project was formulated with the participation of national counterpart and/or target beneficiaries;
- relevant country representatives (from government, industries and civil society) have been appropriately involved and were participating in the identification of critical problem areas and the development of technical cooperation strategies;
- all GEF-4 and GEF-5 projects have incorporated relevant environmental and social considerations into the project design / all GEF-6 projects are following the provisions specified in UNIDO/DGAI.23: UNIDO Environmental and Social Safeguards Policies and Procedures (ESSPP).

B. Project relevance

The evaluation will examine the extent to which the project is relevant to the:

- National development and environmental priorities and strategies of the Government and the population, and regional and international agreements. See possible evaluation questions under “Country ownership/drivenness” below.
- Target groups: relevance of the project’s objectives, outcomes and outputs to the different target groups of the interventions (e.g. companies, civil society, beneficiaries of capacity building and training, etc.).
- GEF’s focal areas/operational programme strategies: In retrospect, were the project’s outcomes consistent with the focal areas/operational program strategies of GEF? Ascertain the likely nature and significance of the contribution of the project outcomes to the wider portfolio of GEF’s Focal area and Operational Program of Climate Change.
- UNIDO’s thematic priorities: Were they in line with UNIDO’s mandate, objectives and outcomes defined in the Programme & Budget and core competencies?
- Does the project remain relevant taking into account the changing environment? Is there a need to reformulate the project design and the project results framework given changes in the country and operational context?

C. Effectiveness: objectives and final results at the end of the project

- The evaluation will assess to what extent results at various levels, including outcomes, have been achieved. In detail, the following issues will be assessed: To what extent have the expected outputs, outcomes and long-term objectives been achieved or are likely to be achieved? Has the project generated any results that could lead to changes of the assisted institutions? Have there been any unplanned effects?
- Are the project outcomes commensurate with the original or modified project objectives? If the original or modified expected results are merely outputs/inputs, the evaluators should assess if there were any real outcomes of the project and, if there were, determine whether these are commensurate with realistic expectations from the project.
- How do the stakeholders perceive the quality of outputs? Were the targeted beneficiary groups actually reached?
- What outputs and outcomes has the project achieved so far (both qualitative and quantitative results)? Has the project generated any results that could lead to changes of the assisted institutions? Have there been any unplanned effects?
- Identify actual and/or potential longer-term impacts or at least indicate the steps taken to assess these (see also below “monitoring of long term changes”). Wherever possible, evaluators should indicate how findings on impacts will be reported in future.
- Describe any catalytic or replication effects: the evaluation will describe any catalytic or replication effect both within and outside the project. If no effects are identified, the evaluation will describe the catalytic or replication actions that the project carried out. No ratings are requested for the project’s catalytic role.

D. Efficiency

The extent to which:

- The project cost was effective? Was the project using the most cost-efficient options?
- Has the project produced results (outputs and outcomes) within the expected time frame? Was project implementation delayed, and, if it was, did that affect cost effectiveness or results? Wherever possible, the evaluator should also compare the costs incurred and the time taken to achieve outcomes with that for similar projects. Are the project’s activities in line with the schedule of activities as defined by the project team and annual work plans? Are the disbursements and project expenditures in line with budgets?
- Have the inputs from the donor, UNIDO and Government/counterpart been provided as planned, and were they adequate to meet the requirements? Was the quality of UNIDO inputs and services as planned and timely?

- Was there coordination with other UNIDO and other donors' projects, and did possible synergy effects happen?

E. Assessment of sustainability of project outcomes

Sustainability is understood as the likelihood of continued benefits after the GEF project ends. Assessment of sustainability of outcomes will be given special attention but also technical, financial and organization sustainability will be reviewed. This assessment should explain how the risks to project outcomes will affect continuation of benefits after the GEF project ends. It will include both exogenous and endogenous risks. The following four dimensions or aspects of risks to sustainability will be addressed:

- **Financial risks**. Are there any financial risks that may jeopardize sustainability of project outcomes? What is the likelihood of financial and economic resources not being available once GEF assistance ends? (Such resources can be from multiple sources, such as the public and private sectors or income-generating activities; these can also include trends that indicate the likelihood that, in future, there will be adequate financial resources for sustaining project outcomes.) Was the project successful in identifying and leveraging co-financing?
- **Sociopolitical risks**. Are there any social or political risks that may jeopardize sustainability of project outcomes? What is the risk that the level of stakeholder ownership (including ownership by governments and other key stakeholders) will be insufficient to allow for the project outcomes/benefits to be sustained? Do the various key stakeholders see that it is in their interest that project benefits continue to flow? Is there sufficient public/stakeholder awareness in support of the project's long-term objectives?
- **Institutional framework and governance risks.** Do the legal frameworks, policies, and governance structures and processes within which the project operates pose risks that may jeopardize sustainability of project benefits? Are requisite systems for accountability and transparency and required technical know-how in place?
- **Environmental risks.** Are there any environmental risks that may jeopardize sustainability of project outcomes? Are there any environmental factors, positive or negative, that can influence the future flow of project benefits? Are there any project outputs or higher level results that are likely to affect the environment, which, in turn, might affect sustainability of project benefits? The evaluation should assess whether certain activities will pose a threat to the sustainability of the project outcomes.

F. Assessment of monitoring and evaluation (M&E) systems

- **M&E design.** Did the project have an M&E plan to monitor results and track progress towards achieving project objectives? The evaluation will assess whether the project met the minimum requirements for the application of the Project M&E plan (see Annex 3).
- **M&E plan implementation.** The evaluation should verify that an M&E system was in place and facilitated timely tracking of progress toward project objectives by collecting information on chosen indicators continually throughout the project implementation period; annual project reports were complete and accurate, with well-justified ratings; the information provided by the M&E system was used during the project to improve performance and to adapt to changing needs; and the project had an M&E system in place with proper training for parties responsible for M&E activities to ensure that data will continue to be collected and used after project closure. Was monitoring and self-evaluation carried out effectively, based on indicators for outputs, outcomes and

impacts? Are there any annual work plans? Was any steering or advisory mechanism put in place? Did reporting and performance reviews take place regularly?

- **Budgeting and Funding for M&E activities.** In addition to incorporating information on funding for M&E while assessing M&E design, the evaluators will determine whether M&E was sufficiently budgeted for at the project planning stage and whether M&E was adequately funded and in a timely manner during implementation.

G. Monitoring of long-term changes

The M&E of long-term changes is often incorporated in GEF-supported projects as a separate component and may include determination of environmental baselines; specification of indicators; and provisioning of equipment and capacity building for data gathering, analysis, and use. This section of the evaluation report will describe project actions and accomplishments towards establishing a long-term monitoring system. The evaluation will address the following questions:

a. Did the project contribute to the establishment of a long-term monitoring system? If it did not, should the project have included such a component?
b. What were the accomplishments and shortcomings in establishment of this system?
c. Is the system sustainable—that is, is it embedded in a proper institutional structure and does it have financing? How likely is it that this system continues operating upon project completion?
d. Is the information generated by this system being used as originally intended?

H. Assessment of processes affecting achievement of project results

Among other factors, when relevant, the evaluation will consider a number of issues affecting project implementation and attainment of project results. The assessment of these issues can be integrated into the analyses of project design, relevance, effectiveness, efficiency, sustainability and management as the evaluators deem them appropriate (it is not necessary, however it is possible to have a separate chapter on these aspects in the evaluation report). The evaluation will consider, but need not be limited to, the following issues that may have affected project implementation and achievement of project results:

a. **Preparation and readiness / Quality at entry.** Were the project's objectives and components clear, practicable, and feasible within its time frame? Were counterpart resources (funding, staff, and facilities), and adequate project management arrangements in place at project entry? Were the capacities of executing institution and counterparts properly considered when the project was designed? Were lessons from other relevant projects properly incorporated in the project design? Were the partnership arrangements properly identified and the roles and responsibilities negotiated prior to project approval?

b. **Country ownership/drivenness.** Was the project concept in line with the sectoral and development priorities and plans of the country—or of participating countries, in the case of multi-country projects? Are project outcomes contributing to national development priorities and plans? Were relevant country representatives from government and civil society involved in the project? Did the recipient government maintain its financial commitment to the project? Has the government—or governments in the case of multi-country projects—approved policies or regulatory frameworks in line with the project's objectives?

c. **Stakeholder involvement.** Did the project involve the relevant stakeholders through information sharing and consultation? Did the project implement appropriate outreach and public awareness campaigns? Were the relevant vulnerable groups and powerful supporters and opponents of the processes properly involved? Which stakeholders were involved in the project (i.e. NGOs, private sector, other UN Agencies, etc.) and

what were their immediate tasks? Did the project consult with and make use of the skills, experience, and knowledge of the appropriate government entities, nongovernmental organizations, community groups, private sector entities, local governments, and academic institutions in the design, implementation, and evaluation of project activities? Were perspectives of those who would be affected by project decisions, those who could affect the outcomes, and those who could contribute information or other resources to the process taken into account while taking decisions?

d. **Financial planning.** Did the project have appropriate financial controls, including reporting and planning, that allowed management to make informed decisions regarding the budget and allowed for timely flow of funds? Was there due diligence in the management of funds and financial audits? Did promised co-financing materialize? Specifically, the evaluation should also include a breakdown of final actual project costs by activities compared to budget (variances), financial management (including disbursement issues), and co-financing.

e. **UNIDO's supervision and backstopping.** Did UNIDO staff identify problems in a timely fashion and accurately estimate their seriousness? Did UNIDO staff provide quality support and advice to the project, approve modifications in time, and restructure the project when needed? Did UNIDO provide the right staffing levels, continuity, skill mix, and frequency of field visits for the project?

f. **Co-financing and project outcomes and sustainability.** If there was a difference in the level of expected co-financing and the co-financing actually realized, what were the reasons for the variance? Did the extent of materialization of co-financing affect project outcomes and/or sustainability, and, if so, in what ways and through what causal linkages?

g. **Delays and project outcomes and sustainability.** If there were delays in project implementation and completion, what were the reasons? Did the delays affect project outcomes and/or sustainability, and, if so, in what ways and through what causal linkages?

h. **Implementation approach.** Is the implementation approach chosen different from other implementation approaches applied by UNIDO and other agencies? Does the approach comply with the principles of the Paris Declaration? Does the approach promote local ownership and capacity building? Does the approach involve significant risks?

The evaluation team will rate the project performance as required by the GEF. The ratings will be given to four criteria: Project Results, Sustainability, Monitoring and Evaluation, and UNIDO related issues as specified in Annex 2. The ratings will be presented in a table with each of the categories rated separately and with brief justifications for the rating based on the findings of the main analysis. An overall rating for the project should also be given. The rating system to be applied is specified in the same annex. As per the GEF's requirements, the report should also provide information on project identification, time frame, actual expenditures, and co-financing in the format in Annex 5, which is modeled after the GEF's project identification form (PIF).

I. Project coordination and management

The extent to which:

- The national management and overall coordination mechanisms have been efficient and effective? Did each partner have assigned roles and responsibilities from the beginning? Did each partner fulfil its role and responsibilities (e.g. providing strategic

support, monitoring and reviewing performance, allocating funds, providing technical support, following up agreed/corrective actions)?

- The UNIDO HQ-based management, coordination, monitoring, quality control and technical inputs have been efficient, timely and effective (e.g. problems identified timely and accurately; quality support provided timely and effectively; right staffing levels, continuity, skill mix and frequency of field visits)?

J. Assessment of gender mainstreaming

The evaluation will consider, but need not be limited to, the following issues that may have affected gender mainstreaming in the project:

- To which extent were socioeconomic benefits delivered by the project at the national and local levels, including consideration of gender dimensions?

VII. Reporting

Inception report

This Terms of Reference (ToR) provides some information on the evaluation methodology, but this should not be regarded as exhaustive. After reviewing the project documentation and initial interviews with the project manager, the International Evaluation Consultant will prepare, in collaboration with the national consultant, a short inception report that will operationalize the ToR relating to the evaluation questions and provide information on what type of and how the evidence will be collected (methodology). It will be discussed with and approved by the responsible UNIDO Evaluation Officer. The Inception Report will focus on the following elements: preliminary project theory model(s); elaboration of evaluation methodology including quantitative and qualitative approaches through an evaluation framework ("evaluation matrix"); division of work between the International Evaluation Consultant and National Consultant; mission plan, including places to be visited, people to be interviewed and possible surveys to be conducted and a debriefing and reporting timetable[6].

Evaluation report format and review procedures

The draft report will be delivered to UNIDO Office for Independent Evaluation–ODG/EVA (the suggested report outline is in Annex 1) and circulated to UNIDO staff and national stakeholders associated with the project for factual validation and comments. Any comments or responses, or feedback on any errors of fact to the draft report provided by the stakeholders will be sent to UNIDO ODG/EVA for collation and onward transmission to the project evaluation team who will be advised of any necessary revisions. On the basis of this feedback, and taking into consideration the comments received, the evaluation team will prepare the final version of the terminal evaluation report.

The ET will present its preliminary findings to the local stakeholders at the end of the field visit and take into account their feed-back in preparing the evaluation report. A presentation of preliminary findings will take place at UNIDO HQ after the field mission.

The TE report should be brief, to the point and easy to understand. It must explain the purpose of the evaluation, exactly what was evaluated, and the methods used. The report must highlight any methodological limitations, identify key concerns and present evidence-based findings, consequent conclusions, recommendations and lessons. The report should provide

[6] The evaluator will be provided with a Guide on how to prepare an evaluation inception report prepared by the UNIDO Office for Independent Evaluation.

information on when the evaluation took place, the places visited, who was involved and be presented in a way that makes the information accessible and comprehensible. The report should include an executive summary that encapsulates the essence of the information contained in the report to facilitate dissemination and distillation of lessons.

Findings, conclusions and recommendations should be presented in a complete, logical and balanced manner. The evaluation report shall be written in English and follow the outline given in Annex 1.

Evaluation work plan

The "Evaluation Work Plan" includes the following main products:

5. Desk review, briefing by project manager and development of methodology: Following the receipt of all relevant documents, and consultation with the Project Manager about the documentation, including reaching an agreement on the methodology, the desk review could be completed.
6. Inception report: At the time of departure to the field mission, all the received material has been reviewed and consolidated into the Inception report.
7. Field mission: The principal responsibility for managing this evaluation lies with UNIDO. It will be responsible for liaising with the project team to set up the stakeholder interviews, arrange the field missions, coordinate with the Government. At the end of the field mission, there will be a presentation of preliminary findings to the key stakeholders in the country where the project was implemented.
8. Preliminary findings from the field mission: Following the field mission, the main findings, conclusions and recommendations would be prepared and presented in the field and at UNIDO Headquarters.
9. A draft terminal evaluation report will be forwarded electronically to the UNIDO Office for Independent Evaluation and circulated to main stakeholders.
10. Final terminal evaluation report will incorporate comments received.

Evaluation phases	**Deliverables**
Desk review	Development of methodology approach and evaluation tools
Briefing with UNIDO Office for Independent Evaluation, Project Managers and other key stakeholder at HQ	Interview notes, detailed evaluation schedule and list of stakeholders to interview during field mission
Data analysis	Inception Evaluation Report
Field mission Present preliminary findings and recommendations to key stakeholders in the field	Presentation of main findings to key stakeholders in the field.
Debriefing at UNIDO HQ	Present preliminary findings and recommendations to the stakeholders at UNIDO HQ Additional interviews and analysis
Analysis of the data collected	Draft Terminal Evaluation Report
Circulation of the draft report to UNIDO/relevant stakeholders and revision	Final Terminal Evaluation Report

VIII. Quality assurance

All UNIDO evaluations are subject to quality assessments by the UNIDO Office for Independent Evaluation. Quality assurance and control is exercised in different ways throughout the evaluation process (briefing of consultants on methodology and process of UNIDO's Office for Independent Evaluation, providing inputs regarding findings, lessons learned and recommendations from other UNIDO evaluations, review of inception report and evaluation report by the Office for Independent Evaluation). The quality of the evaluation report will be assessed and rated against the criteria set forth in the Checklist on evaluation report quality, attached as Annex 4. The applied evaluation quality assessment criteria are used as a tool to provide structured feedback. UNIDO's Office for Independent Evaluation should ensure that the evaluation report is useful for UNIDO in terms of organizational learning (recommendations and lessons learned) and is compliant with UNIDO's evaluation policy and these terms of reference. The draft and final evaluation report are reviewed by UNIDO Office for Independent Evaluation, which will submit the final report to the GEF Evaluation Office and circulate it within UNIDO together with a management response sheet.

Annex 1 - Outline of an in-depth project evaluation report

Executive summary

- Must provide a synopsis of the storyline which includes the main evaluation findings and recommendations
- Must present strengths and weaknesses of the project
- Must be self-explanatory and should be maximum 3-4 pages in length

I. Evaluation objectives, methodology and process

- Information on the evaluation: why, when, by whom, etc.
- Scope and objectives of the evaluation, main questions to be addressed
- Information sources and availability of information
- Methodological remarks, limitations encountered and validity of the findings

II. Country and project background

- Brief country context: an overview of the economy, the environment, institutional development, demographic and other data of relevance to the project
- Sector-specific issues of concern to the project[7] and important developments during the project implementation period
- Project summary:
  - Fact sheet of the project: including project objectives and structure, donors and counterparts, project timing and duration, project costs and co-financing
  - Brief description including history and previous cooperation
  - Project implementation arrangements and implementation modalities, institutions involved, major changes to project implementation
  - Positioning of the UNIDO project (other initiatives of government, other donors, private sector, etc.)
  - Counterpart organization(s)

III. Project assessment

This is the key chapter of the report and should address all evaluation criteria and questions outlined in the TOR (see section VI Project Evaluation Parameters). Assessment must be based on factual evidence collected and analyzed from different sources. The evaluators' assessment can be broken into the following sections:

A. Design
B. Relevance (Report on the relevance of project towards countries and beneficiaries)
C. Effectiveness (The extent to which the development intervention's objectives and deliverables were achieved, or are expected to be achieved, taking into account their relative importance)
D. Efficiency (Report on the overall cost-benefit of the project and partner countries' contribution to the achievement of project objectives)
E. Sustainability of project outcomes (Report on the risks and vulnerability of the project, considering the likely effects of sociopolitical and institutional changes in partner countries, and its impact on continuation of benefits after the GEF project ends, specifically the financial, sociopolitical, institutional framework and governance, and environmental risks)
F. Assessment of monitoring and evaluation systems (Report on M&E design, M&E plan implementation, and budgeting and funding for M&E activities)
G. Monitoring of long-term changes

[7] Explicit and implicit assumptions in the logical framework of the project can provide insights into key-issues of concern (e.g. relevant legislation, enforcement capacities, government initiatives, etc.)

H. Assessment of processes affecting achievement of project results (Report on preparation and readiness / quality at entry, country ownership, stakeholder involvement, financial planning, UNIDO support, co-financing and project outcomes and sustainability, delays of project outcomes and sustainability, and implementation approach)
I. Project coordination and management (Report project management conditions and achievements, and partner countries commitment)
J. Gender mainstreaming

At the end of this chapter, an overall project achievement rating should be developed as required in Annex 2. The overall rating table required by the GEF should be presented here.

IV. Conclusions, recommendations and lessons learned

This chapter can be divided into three sections:

A. Conclusions

This section should include a storyline of the main evaluation conclusions related to the project's achievements and shortfalls. It is important to avoid providing a summary based on each and every evaluation criterion. The main conclusions should be cross-referenced to relevant sections of the evaluation report.

B. Recommendations

This section should be succinct and contain few key recommendations. They should:
- be based on evaluation findings
- be realistic and feasible within a project context
- indicate institution(s) responsible for implementation (addressed to a specific officer, group or entity who can act on it) and have a proposed timeline for implementation if possible
- be commensurate with the available capacities of project team and partners
- take resource requirements into account.

Recommendations should be structured by addressees:
- UNIDO
- Government and/or Counterpart Organizations
- Donor

C. Lessons learned

- Lessons learned must be of wider applicability beyond the evaluated project but must be based on findings and conclusions of the evaluation
- For each lesson, the context from which they are derived should be briefly stated

Annexes should include the evaluation TOR, list of interviewees, documents reviewed, a summary of project identification and financial data, including an updated table of expenditures to date, and other detailed quantitative information. Dissident views or management responses to the evaluation findings may later be appended in an annex.

Annex 2 - Overall ratings table

Criterion	Evaluator's Summary Comments	Evaluator's Rating
Attainment of project objectives and results (overall rating), sub criteria (below)		
Design		
Effectiveness		
Relevance		
Efficiency		
Sustainability of Project outcomes (overall rating) Sub criteria (below)		
Financial risks		
Sociopolitical risks		
Institutional framework and governance risks		
Environmental risks		
Monitoring and Evaluation (overall rating) Sub criteria (below)		
M&E Design		
M&E Plan Implementation (use for adaptive management)		
Budgeting and Funding for M&E activities		
Project management		
UNIDO specific ratings		
Quality at entry / Preparation and readiness		
Implementation approach		
UNIDO Supervision and backstopping		
Overall rating		

RATING OF PROJECT OBJECTIVES AND RESULTS

- Highly Satisfactory (HS): The project had no shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

- Satisfactory (S): The project had minor shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Moderately Satisfactory (MS): The project had moderate shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Moderately Unsatisfactory (MU): The project had significant shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Unsatisfactory (U) The project had major shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Highly Unsatisfactory (HU): The project had severe shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Please note: Relevance and effectiveness will be considered as critical criteria. The overall rating of the project for achievement of objectives and results **may not be higher** than the lowest rating on either of these two criteria. Thus, to have an overall satisfactory rating for outcomes a project must have at least satisfactory ratings on both relevance and effectiveness.

RATINGS ON SUSTAINABILITY

Sustainability will be understood as the probability of continued long-term outcomes and impacts after the GEF project funding ends. The evaluation will identify and assess the key conditions or factors that are likely to contribute or undermine the persistence of benefits beyond project completion. Some of these factors might be outcomes of the project, i.e. stronger institutional capacities, legal frameworks, socio-economic incentives /or public awareness. Other factors will include contextual circumstances or developments that are not outcomes of the project but that are relevant to the sustainability of outcomes.

Rating system for sustainability sub-criteria

On each of the dimensions of sustainability of the project outcomes will be rated as follows.

- Likely (L): There are no risks affecting this dimension of sustainability.
- Moderately Likely (ML). There are moderate risks that affect this dimension of sustainability.
- Moderately Unlikely (MU): There are significant risks that affect this dimension of sustainability.
- Unlikely (U): There are severe risks that affect this dimension of sustainability.

All the risk dimensions of sustainability are critical. Therefore, overall rating for sustainability will not be higher than the rating of the dimension with lowest ratings. For example, if a project has an Unlikely rating in either of the dimensions then its overall rating cannot be higher than Unlikely, regardless of whether higher ratings in other dimensions of sustainability produce a higher average.

RATINGS OF PROJECT M&E

Monitoring is a continuing function that uses systematic collection of data on specified indicators to provide management and the main stakeholders of an ongoing project with indications of the extent of progress and achievement of objectives and progress in the use of allocated funds. Evaluation is the systematic and objective assessment of an on-going or completed project, its design, implementation and results. Project evaluation may involve the definition of appropriate standards, the examination of performance against those standards, and an assessment of actual and expected results.

The Project M&E system will be rated on 'M&E Design', 'M&E Plan Implementation' and 'Budgeting and Funding for M&E activities' as follows:

- Highly Satisfactory (HS): There were no shortcomings in the project M&E system.
- Satisfactory(S): There were minor shortcomings in the project M&E system.
- Moderately Satisfactory (MS): There were moderate shortcomings in the project M&E system.
- Moderately Unsatisfactory (MU): There were significant shortcomings in the project M&E system.
- Unsatisfactory (U): There were major shortcomings in the project M&E system.
- Highly Unsatisfactory (HU): The Project had no M&E system.

"M&E plan implementation" will be considered a critical parameter for the overall assessment of the M&E system. The overall rating for the M&E systems will not be higher than the rating on "M&E plan implementation."

All other ratings will be on the GEF six point scale:

HS	= Highly Satisfactory	Excellent
S	= Satisfactory	Well above average
MS	= Moderately Satisfactory	Average
MU	= Moderately Unsatisfactory	Below Average
U	= Unsatisfactory	Poor
HU	= Highly Unsatisfactory	Very poor (Appalling)

Annex 3 - GEF Minimum requirements for M&E[8]

Minimum Requirement 1: Project Design of M&E

All projects will include a concrete and fully budgeted M&E plan by the time of work program entry for full-sized projects (FSP) and CEO approval for medium-sized projects (MSP). This M&E plan will contain as a minimum:

- SMART indicators for project implementation, or, if no indicators are identified, an alternative plan for monitoring that will deliver reliable and valid information to management;
- SMART indicators for results (outcomes and, if applicable, impacts), and, where appropriate, indicators identified at the corporate level;
- Baseline for the project, with a description of the problem to be addressed, with indicator data, or, if major baseline indicators are not identified, an alternative plan for addressing this within one year of implementation;
- Identification of reviews and evaluations that will be undertaken, such as mid-term reviews or evaluations of activities; and
- Organizational set-up and budgets for monitoring and evaluation.

Minimum requirement 2: Application of Project M&E

Project monitoring and supervision will include implementation of the M&E plan, comprising:

- SMART indicators for implementation are actively used, or if not, a reasonable explanation is provided;
- SMART indicators for results are actively used, or if not, a reasonable explanation is provided;
- The baseline for the project is fully established and data compiled to review progress reviews, and evaluations are undertaken as planned; and
- The organizational set-up for M&E is operational and budgets are spent as planned.

[8] http://www.thegef.org/gef/sites/thegef.org/files/documents/ME_Policy_2010.pdf

Annex 4 - Checklist on evaluation report quality

Independent terminal evaluation of UNIDO-GEF project:

Project Title:

Project Number:

Checklist on evaluation report quality

Report Quality Criteria	UNIDO Office for Independent Evaluation Assessment notes	Rating
A. The terminal evaluation report presented an assessment of all relevant outcomes and achievement of project objectives in the context of the focal area program indicators if applicable.		
B. The terminal evaluation report was consistent, the evidence presented was complete and convincing, and the ratings were well substantiated.		
C. The terminal evaluation report presented a sound assessment of sustainability of outcomes.		
D. The lessons and recommendations listed in the terminal evaluation report are supported by the evidence presented and are relevant to the GEF portfolio and future projects.		
E. The terminal evaluation report included the actual project costs (totals, per activity, and per source) and actual co-financing used.		
F. The terminal evaluation report included an assessment of the quality of the M&E plan at entry, the operation of the M&E system used during implementation, and the extent M&E was sufficiently budgeted for during preparation and properly funded during implementation.		

Rating system for quality of evaluation reports

A number rating 1-6 is used for each criterion: Highly Satisfactory = 6, Satisfactory = 5, Moderately Satisfactory = 4, Moderately Unsatisfactory = 3, Unsatisfactory = 2, Highly Unsatisfactory = 1, and unable to assess = 0.

Annex 5 – Required project identification and financial data

The evaluation report should provide information on project identification, time frame, actual expenditures, and co-financing in the following format, which is modeled after the project identification form (PIF).

I. Dates

Milestone	Expected Date	Actual Date
Project CEO endorsement/approval date		
Project implementation start date (PAD issuance date)		
Original expected implementation end date (indicated in CEO endorsement/approval document)		
Revised expected implementation end date (if any)		
Terminal evaluation completion		
Planned tracking tool date		

II. Project Framework

Project component	Activity type	GEF Financing (in USD)		Co-financing (in USD)	
		Approved	Actual	Promised	Actual
1.					
2.					
3.					
4.					
5.					
6. Project management					
Total					

Activity types are:

a) Experts, researches hired
b) technical assistance, Workshop, Meetings or experts consultation scientific and technical analysis, experts researches hired
c) Promised co-financing refers to the amount indicated on endorsement/approval.

III. Co-financing

		Project preparation		**Project implementation**		**Total**	
Source of co-financing	Type	Expected	Actual	Expected	Actual	Expected	Actual
Host gov't contribution							
GEF Agency(-ies)							
Bilateral aid agency(ies)							
Multilateral agency(ies)							
Private sector							
NGO							
Other							
Total cofinancing							

Expected amounts are those submitted by the GEF Agencies in the original project appraisal document. Co-financing types are grant, soft loan, hard loan, guarantee, in kind, or cash.

Annex 6 – Job descriptions

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

TERMS OF REFERENCE FOR PERSONNEL UNDER INDIVIDUAL SERVICE AGREEMENT (ISA)

Title:	International evaluation consultant
Main Duty Station and Location:	Home based
Missions:	Missions to Vienna, Austria and Chad
Start of Contract (EOD):	September 1, 2015
End of Contract (COB):	October 31, 2015
Number of Working Days:	30 working days spread over 2 months

1. ORGANIZATIONAL CONTEXT

The Office for Independent Evaluation is responsible for the independent evaluation function of UNIDO. It supports learning, continuous improvement and accountability, and provides factual information about result and practices that feed into the programmatic and strategic decision-making processes. Evaluation is an assessment, as systematic and impartial as possible, of a programme, a project or a theme. Independent evaluations provide evidence-based information that is credible, reliable and useful, enabling the timely incorporation of findings, recommendations and lessons learned into the decision-making processes at organization-wide, programme and project level. The Office for Independent Evaluation is guided by the UNIDO Evaluation Policy, which is aligned to the norms and standards for evaluation in the UN system.

2. PROJECT CONTEXT

As far as energy consumption is concerned, the Republic of Chad, like many low income countries, faces the dual challenge of (i) increasing the access to modern energy needed for the economic development and social stability of its population who have no access to electricity and are dependent almost wholly on biomass fuels for energy services, and (ii) having access to the finance required to develop a low carbon sustainable economy. Access to modern energy services can be gained either by increasing the country's own generation capacity and extending the national grid to all areas, or by establishing decentralized mini-grids.

The establishment of viable and functional renewable energy-powered decentralised mini grids in rural areas faces a number of barriers, some of which are specific to mini-grids and some of which are specific to the use of renewable energy to power mini-grids. Some of these barriers which need to be overcome are as follows:

- Lack of legal and regulatory framework;

- Lack of information on available renewable energy resources;
- Lack of technical capacities and appreaciation of technical feasibility and commercial viability of renewable energy;
- Lack of access to capital and the need to engage public and private sector.

The project aims to reduce the institutional, technical and financial barriers so that a better understanding of the potentials of renewable energy resources is achieved and sustainable pathways to valorizing these resources are promoted with the involvement of the private sector. Moreover, it aims at promoting renewable energies based mini-grids in order to increase the rate of access of the peri-urban and rural populations to electricity and replacing fossil energies.

Detailed background information of the project can be found the Terms of Reference (TOR) for the terminal evaluation.

3. DUTIES AND RESPONSIBILITIES

MAIN DUTIES	Concrete/ Measurable Outputs to be achieved	Working Days	Location
1. Review project documentation and relevant country background information (national policies and strategies, UN strategies and general economic data); determine key data to collect in the field and adjust the key data collection instrument of 3A accordingly (if needed); Assess the adequacy of legislative and regulatory framework relevant to the project's activities and analyze other background info.	• Adjust table of evaluation questions, depending on country specific context; • Draft list of stakeholders to interview during the field missions; • Brief assessment of the adequacy of the country's legislative and regulatory framework.	6 days	HB
2. Briefing with the UNIDO Office for Independent Evaluation, project managers and other key stakeholders at UNIDO HQ. Preparation of the Inception Report	• Detailed evaluation schedule with tentative mission agenda (incl. list of stakeholders to interview and site visits); mission planning; • Division of evaluation tasks with the National Consultant. • Inception Report	2 days	Vienna, Austria
3. Conduct field mission to Chad in **September 2015**[9]**.**	• Conduct meetings with relevant project stakeholders, beneficiaries, etc. for the collection of data and clarifications; • Agreement with the National Consultant on the structure	7 days	Chad

[9] The exact mission dates will be decided in agreement with the Consultant, UNIDO HQ, and the country counterparts.

MAIN DUTIES	Concrete/ Measurable Outputs to be achieved	Working Days	Location
	and content of the evaluation report and the distribution of writing tasks; • Presentations of the evaluation's initial findings, draft conclusions and recommendations to stakeholders in the country at the end of the missions.		
4. Present overall findings and recommendations to the stakeholders at UNIDO HQ	• After field mission(s): Presentation slides, feedback from stakeholders obtained and discussed	2 days	Vienna, Austria
5. Prepare the evaluation report according to TOR; Coordinate the inputs from the National Consultant and combine with her/his own inputs into the draft evaluation report.	• Draft evaluation report.	8 days	HB
6. Revise the draft project evaluation reports based on comments from UNIDO Office for Independent Evaluation and stakeholders and edit the language and form of the final version according to UNIDO standards.	• Final evaluation report.	5 days	HB
	TOTAL	**30 days**	

MINIMUM ORGANIZATIONAL REQUIREMENTS

Education:

Advanced degree in environment, energy, engineering, development studies or related areas

Technical and functional experience:

- Minimum 10 years' experience in environmental projects
- Knowledge about multilateral technical cooperation and the UN, international development priorities and frameworks.
- Knowledge of and experience in environmental projects management and/or evaluation (of development projects)
- Working experience in developing countries
- Experience in evaluation of GEF energy projects and knowledge of UNIDO activities an asset

Languages:

Fluency in written and spoken English and French is required.

Reporting and deliverables

1) At the beginning of the assignment the Consultant will submit a concise Inception Report that will outline the general methodology and presents a concept Table of Contents;

2) The country assignment will have the following deliverables:
   - Presentation of initial findings of the mission;
   - Draft report;
   - Final report, comprising of executive summary, findings regarding design, implementation and results, conclusions and recommendations.

3) Debriefing at UNIDO HQ:
   - Presentation and discussion of findings;
   - Concise summary and comparative analysis of the main results of the evaluation report.

All reports and related documents must be in English and presented in electronic format.

Absence of conflict of interest:

According to UNIDO rules, the consultant must not have been involved in the design and/or implementation, supervision and coordination of and/or have benefited from the programme/project (or theme) under evaluation. The consultant will be requested to sign a declaration that none of the above situations exists and that the consultants will not seek assignments with the manager/s in charge of the project before the completion of her/his contract with the UNIDO Office for Independent Evaluation.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

TERMS OF REFERENCE FOR PERSONNEL UNDER INDIVIDUAL SERVICE AGREEMENT (ISA)

Title:	National evaluation consultant
Main Duty Station and Location:	Home-based
Mission/s to:	Travel to potential sites within Chad
Start of Contract (EOD):	1 November 2015
End of Contract (COB):	31 December 2015
Number of Working Days:	30 days spread over 2 months

ORGANIZATIONAL CONTEXT

The Office for Independent Evaluation is responsible for the independent evaluation function of UNIDO. It supports learning, continuous improvement and accountability, and provides factual information about result and practices that feed into the programmatic and strategic decision-making processes. Evaluation is an assessment, as systematic and impartial as possible, of a programme, a project or a theme. Independent evaluations provide evidence-based information that is credible, reliable and useful, enabling the timely incorporation of findings, recommendations and lessons learned into the decision-making processes at organization-wide, programme and project level. The Office for Independent Evaluation is guided by the UNIDO Evaluation Policy, which is aligned to the norms and standards for evaluation in the UN system.

PROJECT CONTEXT

The National Evaluation Consultant will evaluate the projects according to the Terms of Reference under the leadership of the Team Leader (International Evaluation Consultant). S/he will perform the following tasks:

MAIN DUTIES	**Concrete/measurable outputs to be achieved**	**Expected duration**	**Location**
Review and analyze project documentation and relevant country background information (national policies and strategies, UN strategies and general economic data); in cooperation with the Team Leader: determine key data to collect in the	• List of detailed evaluation questions to be clarified; questionnaires/interview guide; logic models; list of key data to collect, draft list of stakeholders to interview during the field	8 days	Home-based

MAIN DUTIES	**Concrete/measurable outputs to be achieved**	**Expected duration**	**Location**
field and prepare key instruments in both English and local language (questionnaires, logic models) to collect these data through interviews and/or surveys during and prior to the field missions; Coordinate and lead interviews/ surveys in local language and assist the Team Leader with translation where necessary; Analyze and assess the adequacy of legislative and regulatory framework, specifically in the context of the project's objectives and targets; provide analysis and advice to the Team Leader on existing and appropriate policies for input to the TE.	missions • Drafting and presentation of brief assessment of the adequacy of the country's legislative and regulatory framework in the context of the project.		
Review all project outputs/ publications/feedback; Briefing with the evaluation team leader, UNIDO project managers and other key stakeholders. Coordinate the evaluation mission agenda, ensuring and setting up the required meetings with project partners and government counterparts, and organize and lead site visits, in close cooperation with the Project Management Unit. Assist and provide detailed analysis and inputs to the Team Leader in the Preparation of the Inception Report.	• Interview notes, detailed evaluation schedule and list of stakeholders to interview during the field missions. • Division of evaluation tasks with the Team Leader. • Inception Report.	7 days	Home-based (telephone interviews)
Coordinate and conduct the field mission with the Team Leader in cooperation with the Project Management Unit, where required; Consult with the Team Leader on the structure and content of the evaluation report and the distribution of writing tasks.	• Presentations of the evaluation's initial findings, draft conclusions and recommendations to stakeholders in the country at the end of the mission. • Agreement with the Team Leader on the structure and content of the evaluation report and the distribution of writing tasks.	7 days (including travel days)	Chad
Prepare inputs and analysis to the evaluation report according to TOR and as agreed with the Team	Draft evaluation report prepared.	6 days	Home-based

MAIN DUTIES	Concrete/measurable outputs to be achieved	Expected duration	Location
Leader.			
Revise the draft project evaluation report based on comments from UNIDO Office for Independent Evaluation and stakeholders and edit the language and form of the final version according to UNIDO standards.	Final evaluation report prepared.	2 days	Home-based
TOTAL		**30 days**	

REQUIRED COMPETENCIES

Core values:
1. Integrity
2. Professionalism
3. Respect for diversity

Core competencies:
1. Results orientation and accountability
2. Planning and organizing
3. Communication and trust
4. Team orientation
5. Client orientation
6. Organizational development and innovation

Managerial competencies (as applicable):
1. Strategy and direction
2. Managing people and performance
3. Judgement and decision making
4. Conflict resolution

MINIMUM ORGANIZATIONAL REQUIREMENTS

Education: Advanced university degree in environmental science, engineering or other relevant discipline like developmental studies with a specialization in industrial energy efficiency and/or climate change.

Technical and functional experience:
- A minimum of five years practical experience in the field of environment and energy, including evaluation experience at the international level involving technical cooperation in developing countries.
- Exposure to the needs, conditions and problems in developing countries.
- Familiarity with the institutional context of the project is desirable.

Languages: Fluency in written and spoken English, French and Arabic is required.

Absence of Conflict of Interest:

According to UNIDO rules, the consultant must not have been involved in the design and/or implementation, supervision and coordination of and/or have benefited from the programme/project (or theme) under evaluation. The consultant will be requested to sign a declaration that none of the above situations exists and that the consultants will not seek assignments with the manager/s in charge of the project before the completion of her/his contract with the Office for Independent Evaluation.

Annex 7 – Project results framework

Outcomes	Indicators	Baseline	Target	Sources of verification	Risks and assumptions
Objective					
To promote selected renewable energy technologies for mini-grid connected rural electrification in Chad, and thereby avoid GHG emissions.	1. Incremental direct CO2eq emission reductions (tons of CO2eq) and incremental indirect CO2eq emission reductions (tons of CO2eq) 2. Number of electricity connections on selected sites. 3. Number of selected local businesses and households with access to electricity on selected sites.	1. No direct CO2eq or indirect emission reductions. 2. Weak or no economic activities in the area without energy access 3. Weak or no reliable health care in the area without energy access 4. Weak education institutions in the area without energy access	1. Direct emission reductions: approx. 3,900 tons CO2eq 2. Indirect emission reductions: from 19,500 to 24,700 tons CO2eq over period 2014-2024.	1. Monitoring reports and site visits 2. End of project survey 3. Mid term and final evaluation	A1. Sustained and solid Government support to the project. A2. Poverty reduction and economic growth drives for securing the modern energy input to development grow progressively stronger. A3. Security and stability in the country A4.Various international RE technical cooperation programs achieve good synergy and leverage of respective complementarities.

Component 1. Institutional, policy and financial mechanisms					
Outcomes	**Indicators**	**Baseline**	**Target**	**Sources of verification**	**Risks and assumptions**
An effective, market-oriented policy and regulatory framework	11. Number of RE policy programs developed and validated	1. Weak institutional support 2- Lack of effective	1. 8 seminars delivered. 2. Around 10 policy makers and other stakeholders	1. Monitoring reports and site visits	A1. Sustained and solid Government support to the project.

to stimulate investments in RE.	2. Adoption of regulatory measures to support RE and market transformation 3. Photovoltaic mini grid systems information and dissemination seminars, education and outreach materials available 4. Energy Institutional framework effective and role of main actors in promoting a RE market defined. 5. Local financial service providers aware and have expertise of analysis and evaluation of risks related to investments on renewable energies. 5. Package of investment incentives, standardized PPAs, tariffs, pricing mechanisms, risk management instruments and viable solar PV based rural mini grids business models developed	institutional framework and no specific regulations to support RE is in place. 3. Local financial service and Lack information and technical capacity related to RE investment. 4. Week private sector involvement in RE energy based electrification	trained. 3. 10 financial institutions' staff trained. 4. The awareness and technical capacity built of 10 of private sector actors. 5. Best Practice publications. 6. Case studies developed. 7. PPP financial mechanism conceived and ready for practical validation 8. Outreach materials.	2. End of project survey 3. Mid term and final evaluation	A2. Poverty reduction and economic growth drives for securing the modern energy input to development grow progressively stronger.

Component 2. Assist project developers with feasibility studies					
Outcomes	**Indicators**	**Baseline**	**Target**	**Sources of verification**	**Risks and assumptions**
A portfolio of RE energy projects prepared for pilot PPP investments during and post GEF- project promoting PPP and productive uses	1. Project sites identified and its end-use evaluated. 2. A portfolio of viable and bankable projects for the installation of PV mini grids by private investors following PPP a pre-defined set of criteria.	1. No reliable information available on viable RE projects.	1. A portfolio of 10 viable PV mini grid projects A number of private developers and investors interested in establishing and or managing, and consequently, one or two private-public sector based PV mini grids; materialized during the GEF project and the remaining take place after its completion.	1. Monitoring reports and site visits. 2. End of project survey. 3. Mid-term and final evaluation.	A1. Counterpart coordinates and executes the project efficiently and effectively A2. General security and stability in the country. A3. Security and stability in the country

Component 3- Technology demonstration and creation of awareness and technical capacities					
Outcomes	**Indicators**	**Baseline**	**Target**	**Sources of verification**	**Risks and assumptions**
Reduced GHG emissions and increased access to rural electrification following increased awareness and technical capabilities of stakeholders to evaluated technical and commercial viability of photovoltaic based mini grids and reduced barriers to development of businesses in renewable energies.	1. Number of small businesses and households using electricity as main source for lightning and productive uses.	1. No local businesses or households with access to electricity in selected sites. 2. Small diesel generators, candles and batteries are the only modern energy and are afforded by elites only.	1. 5 pilot photovoltaic based mini grids of around 50 kW each installed and operational. 2. Approx. 250 electricity connections per site by 2014 (in total approx.1250 households and small local businesses). 3. In total, approx. 6250 persons served by access to electricity by 2014.	1. Monitoring reports and site visits. 2. End of project survey. 3. Mid-term and Final evaluation.	A1. Coherent community acceptance to the participative approach to developing and establishing the mini grids. A2. Beneficiaries understand the benefits of the new approach. A3. General security and stability in the country. A4. Financing from all sources made on a timely basis in line with proposed activities and budget

Annex 8 – Revised Project results framework (MTR)

Project Strategy		Objectively verifiable indicators				
		Indicator (quantified and time-bound)	**Baseline**	**Target**	**Source of verification**	**Risks and Assumptions**
Objective of the project	Avoid greenhouse gas emissions by promoting renewable energy technologies for mini-grid rural electrification in Chad	1. Incremental direct and indirect CO_2 emission reduced (tonnes of CO_2eq) 2. No. of electricity connections on selected sites 3. No. selected local businesses and households with access to electricity on selected sites	No direct or indirect CO_2eq emission avoidance	Direct emission reductions: 2235 tCO2eq Indirect emission reductions fro 19,500 to 24,700 tCO2eq. Approx. 300 connections (hh and small businesses)	GEF project tracking tool Project documents	
Project Component 1 – Institutional, financial, policy and regulatory framework						
OUTCOME 1.1	An effective, market oriented policy and regulatory framework to stimulate investments in RE	Availability of strategic framework for RE	No strategic framework for RE	Validated strategic framework for RE	MPE and project documents Signed minutes of validation meeting	Sustained and solid Government support to the project Poverty reduction and economic growth drives for securing the modern energy input to development grow progressively stronger
Output 1.1.	Review of regulatory framework to establish a institutional and regulatory strategic framework for the promotion of RE	Review of international frameworks relevant to Chad	No review	Review of international frameworks relevant to Chad published	Project reports	Political support for the project Missing information on existing regulatory texts Delays in identifying suitable expert
		Recommendations for specific strategic framework for RE in Chad	No clear strategies for RE in Chad	Clear strategic framework for RE in Chad	MPE documents	
Output 1.2	Support the development of an Electricity Code for	Recommendations for elaborating Electricity code	No clear electricity code for Chad	Recommendations on Electricity Code	Project and government documents	

	Chad					
Output 1.3	Validation and adoption of the proposed strategic framework for RE	No of validation meetings Adoption of RE strategic framework	No strategic framework or discussions	3 validation meetings Signed adoption of strategic framework	Meeting minutes Project and government documents	
Project Component 2 – Assist private developers with feasibility studies						
OUTCOME 2.1	A portfolio of RE projects prepared for pilot private sector investments during and post the GEF	Identification of number of project sites for installation of economically viable RE systems and prioritised for productive use.		4-5 project sites identified and detailed feasibility studies prepared		Counterpart coordinates and executes the project efficiently and effectively. General security and stability in the country
Output 2.1.	Identify and prepare feasibility studies for a number of economically viable RE systems prioritised for productive use	Number of finalised feasibility studies for economically viable PV- mini-grids with productive uses	No feasibility studies carried out	5 detailed feasibility studies completed	Project documents – copies of feasibility studies	Targeted stakeholders show willingness for training. Training programme successfully implemented Private stakeholders will engage with project activities Political will from MPE to increase their RE capacity Political will to work with the private sector Lack of engagement from MPE to establish a department and to make staff available Lack of interest from public and private sector to attend training and to engage in partnership The business environment does not
Output 2.2	Capacity building for public sector actors to design, promote and manage RE projects and establishment of public-private partnerships	No. training sessions (disaggregated by type – planning/ design / software)	No training in RE	X training sessions (y on planning, z on software)	Participant logs and evaluation forms Copies of training material Copies of manuals	
		No. of public sector trainees	No trained public sector employees	X trained employees		
		No. of private sector trainees	No trained private sector employees	X trained private sector employees		
		% female trainees	No female trainees	X trained females		
		No. of public sector actors capable of designing, promoting and managing RE projects	No employees capable to design, promote or manage RE projects	X public sector employees able to design, promote and manage RE projects		
		Private-public partnership is operational	None in existence	One partnership is operational		

		Establishment of a RE department in MPE	No department	Department established made up of x experts		attract private investment
		Number of meetings between private and public sector actors to discuss RE investment	No meetings	X meetings	Minutes of meetings	
		Barriers to development of RE projects are identified and recommendations developer for overcoming them	No reports or analysis on barriers to private sector input into RE	Report on barriers to RE	Copy of project documents	
		Identification and map of current state of private sector investment and key stakeholders	No mapping or identification	Map of private sector investments and key stakeholders interested in RE	Copy of the project documents and maps	
Project Component 3 – Technology demonstration and creation of awareness and technical capacity development						
OUTCOME 3.1	Reduced GHG emissions and increased access to rural electrification	Incremental direct and indirect CO2 eq emission reductions (in CO2eq) Number of connections per site and number of households and small local businesses with access to electricity Trainings conducted for the local authority officers and interested private sector service providers		Direct emissions reduction of approx. 2,235 tons CO2 eq; indirect emission reduction of 19,500-24,700 tons of CO2 eq over the period of 10 years -Approx. 300 households and small businesses with access to electricity - 8 training delivered		Coherent community acceptance to the participative approach to developing and establishing mini-grids Beneficiaries understand the benefits of the new approach General security and stability in the country Financing from all sources made on a timely basis in line with proposed activities and budget

Output 3.1	5 PV mini-grids installed and operational	Number of PV mini-grids installed and operational	No PV mini-grids installed	5 PV mini-grids installed at: Douguia Mombou Guelendeng Dourbali Mailao	Project documents	Construction mistakes Delays in equipment transport (customs, to site)
		Number of connections per site and number of households and institutions with access to electricity	No connections to mini-grids	1250 connections X households connected Y institutions connected (disaggregated by site)	Project documents	
		Installed capacity of PV in PV mini-grids (MW)	0 installed	Installed capacity of more than 157 kW (disaggregated by site)	Project documents Site visits	
		Direct CO2 eq. emissions avoided	No emissions avoided	2235 t CO_2 eq	Project documents	
		Performance monitoring, evaluation reports and case studies on each GEF supported project	No dissemination material PV mini-grids in Chad	2-4 case studies	Project documents	
3.2	Establish community management models for mini-grids	Number of community management models established Number of Local Association established	No community management models in place. No local associations for management established	5 community managed local associations established and operating	Project reports, Association statues, Association meeting minutes	Lack of engagement from local community
	Development manuals and handbooks for O&M and management	Number of manuals and O&M handbooks	No manuals or O&M handbooks	Manuals and O&M handbook for each site (5)	Project documents	
	Preparing as-built documents and final report	Number of as-built documents and final report	No as-build documents	As built documents for each site (5) and final report (1)	Project documents	

3.5	Training a local operator and technician team for O&M and management	No. of local trainees	No local trainees in mini-grid O&M and management	X trained people at each project site (total of y)	Project reports Training manuals Evaluation forms Participant list	Lack of engagement from local community
3.6	Promotion of productive uses and development of RE value chains	No. of businesses connected	Businesses use own diesel generation or have no electricity	X businesses connected (disaggregated by site)	Project reports	
Other						
	Demonstration of the benefits of rural PV-mini-grids	No. of case studies	No case studies	2-4 case studies	Copies of case studies	
	Dissemination and public awareness	No. of project bulletins	None	X project bulletins	Copies of bulletins	

Annex B: List of persons met (interviewees)

Organisation	Key Participants	Role	Relevance to the evaluation	Date
UNIDO	Mark Draeck	Industrial Development Officer PTC/ENE/RRE	Project Manager	September and October 2015
UNIDO	Javier Guarnizo	Officer-In-Charge UNIDO Office for Independent Evaluation	Senior Evaluation Officer	24 October 2015
UNIDO	Silvia Alamo	International Evaluation Consultant		24 October 2015
UNIDO	Diego Masera	Previous Unit Chief PTC/ENE/RRE	Previous Project Manager	October 2015
UNIDO	Fatin Ali Mohamed	Industrial Development Officer PTC/ENV/SCU	First Project Manager / Project Designer	October 2015
UNIDO	Manuel Mattiat	Consultant PTC/ENE/RRE	Consultant / Project Manager	September and October 2015
UNIDO	Edme Koffi	Unit Chief Africa Programme	Previous Project Manager	16 October 2015
UNIDO	Siham Chafak	Programme Manager African Programme	Responsible for UNIDO Country Programme Chad	October 2015
UNIDO	Bashir Condé	Industrial Development Officer at Africa Programme	Responsible for UNIDO Country Programme Chad	October 2015
UNIDO	Ahmat Moussa	National Project Coordinator at PCU		October 2015

Organisation	Key Participants	Role	Relevance to the evaluation	Date
Ministry of Energy and Petrol	Djerassem le Bémadjiel	Minister of Energy	Governmental official	October 2015
		Secretary General	Governmental official	October 2015
		Director General, Energy	Governmental official	October 2015
		Director of Renewable Energy	Governmental official, Training beneficiary	October 2015
Association pour le Developpement des Energies Renouvables (ADER)	Dangaye Jean-Paul M'Batna Limatna Arthur Houssadi	General Co-ordinator General Administrator	Governmental official, training beneficiary	October 2015
Sylvanus	Bassounda Sylvanus	Lawyer	Consultant for component 1 & 2	October 2015
Douguia Local Association,	Abicho Ahmat Makaïla Mahamat Djibrilla Alifa	President Technician Maintenance	Representatives of beneficiaries of component 3 (electricity)	October 2015
Mombou Local Association	Mbodou Issa Moussa Abdoulaye Kaltouma Ali Mbodou Abdoulaye Abdel kérim Haroun Herta Issa	President Vice President Secretary Financial Controler Representant Sages Women representative	Representatives of beneficiaries of component 3 (electricity)	October 2015
Mombou, Guelendeng and Douguia users		School teacher Water pump and welding owner, Association leader	Beneficiary of component 3 (electricity)	October 2015

Organisation	Key Participants	Role	Relevance to the evaluation	Date
Mombou, Guelendeng and Douguia management team		Manager Technician Guard	Beneficiary of component 3 (electricity and training)	October 2015
IDEB	Abakar Abdoulaye		TTA sub-contractor and training beneficiary	October 2015
TTA	Marta Pascuel Pablo Munoz	Local project coordinator Engineer	UNIDO contractor for Component 3	October 2015
	Xavier Vallve	Project manager		October 2015
Guelendeng Maire		Mayor	Future beneficiary and key consultee	October 2015
E3analytics	Toby Couture	Consultant	Consultant for Component 1 & 2	October 2015

Annex C: Evaluation Matrix

Judgment Criteria	Evaluation Questions	Indicator(s) proposed	Means of verification	Source of verification
1. RELEVANCE **To what extent does the Project relate to Chad environmental and energy policies and priorities and to global environmental benefits and the main objectives of GEF focal areas**				
How does the Project support the GEF climate Change focal area	Is the Project relevant to the GEF climate change focal area	• Existence of clear relationship between the Project objectives and the GEF climate change focal area	Desk review	Project documents GEF focal area strategies and documents
Project addresses identified Challenges in the	Is the Project relevant to Chad environmental and energy policies and priorities? a) What are the Project 'objectives', 'planned outputs', 'activities and inputs'? (b) What are the local and national environmental priorities and policies, and expected global environmental benefits to be obtained? (c) Are (a) formulated with relevance to (b)?	• Coherence matrix showing Project objectives and identified national energy priorities, policies and strategies	Desk review	Project documents and reviews, national energy policies
		• Perceptions of in-country stakeholders, including energy sector practitioners, CSOs, NGOs, communities, local government, as to whether Project responds to national priorities and existing capacities	Interviews	Project partners and other organizations, stakeholders
	Do (a) continue to be relevant in relation to (b) at the midterm point of the Project?	• Evidence of adjustment of Project activities during implementation because of new information on challenges or concerns	Interviews	UNIDO staff and relevant peers and stakeholders
Level of stakeholder ownership in Project / Project addresses concerns of stakeholders	Is the Project addressing the needs of the target beneficiaries	• Level of involvement of government officials and other partners in the Project design process	Interviews	Government reps
		• Degree of involvement and inclusiveness of stakeholders in Project design	Interviews	Other stakeholder groups (industry,ADER)
		• Strength of link between expected results and the needs of relevant stakeholders	Interviews	Project partners and other organizations

Judgment Criteria	Evaluation Questions	Indicator(s) proposed	Means of verification	Source of verification
Is the Project relevant with respect to other donor supported activities	Does GEF funding support activities not addressed by other donors / How does it fill the gaps?	• Degree to which Project is coherent and complementary to other donor programming • Is there co-ordination and complementarity between donors • Other possible options for industry to meet their needs in goods and services area covered by Project	Document review Interviews	Documents from other donors Other donor reps Project documents
Project has a clear identity and niche	Project has a clear identity	• Perceived relative advantages of working with Project over other competitive options, according to clients and other stakeholders	Interviews	Project stakeholders
Assumptions and targets are realistic	a) Are the assumptions on which the Project strategy is based reflective of the operational realities on the ground? (b) How have the assumptions been used to formulate planned activities? (c) Has the Project strategy been formulated with targets that are (i) clearly defined, (ii) measurable and (iii) achievable, given the lifetime of the Project? (d) Have any amendments to the assumptions or targets been made or planned during the Project's implementation? If so, (i) how were these carried out, (ii) for what purpose, and (iii) what were the consequences of these amendments?	• Extent to which assumptions are reflected in project documents and strategy • Extent to which targets are deemed realistic by stakeholders	Document review Interviews	Project documents Stakeholders (project staff, govt, industry, banks, industry)
Risks identified at Project design are still adequate	a) Are the risks identified at Project design still adequate? b) Have any new risks emerged?	• Extent to which identified risks are adequate	Desk review Interviews	Project documents Stakeholders
Intervention logic reflects program objectives at each level of Project planning and implementation	In each area of the work plan, are the identified activities, outputs, and products appropriate to the objectives of the Project?	• Extent to which Project objectives are reflected in planned activities and services	Desk review	Project documents
Program results are measureable	Are program results measureable?	• Number and type of performance measurement indicators for monitoring of implementation of strategy and intended results in planning documents	Desk review	Project documents/ results framework

Judgment Criteria	Evaluation Questions	Indicator(s) proposed	Means of verification	Source of verification
		• Level of reporting on performance measurement indicators for monitoring of implementation of strategy and intended results stated in planning documents		
Any amendments still ensure Project on track to meet target	a) Were any amendments to Project design made during implementation to date? (b) If so, why and with what consequences? (c) Is the Project on track to meet its targets? (d) What recommendations, if any, can be made based on the mid-term review to ensure the Project is on track to meet its targets?	• Number of amendments made to project design	Desk review Interviews	Project management documents UNIDO staff
2. EFFECTIVENESS **To what extent have/will the expected outcomes and objectives of the Project been/will be achieved?**				
The Project has achieved its mid-term objectives	Has the Project been effective in achieving the expected outcomes and objectives?	• Degree of achievement in meeting Project objectives as set out in the Project results framework • Program level of achievement (intended and unintended outputs, outcomes and impacts) • Number of planned vs. implemented Projects/activities • (see indicators in document)	Interviews Desk review	Project management and relevant peers and stakeholders Project documents and reviews, other relevant docs
Project management exhibits flexibility in reaching Project objectives	To what extent does the Project management have the flexibility to design and effectively execute the activities to achieve Project goals? a) Has the Project team made use of results based management/ adaptive management processes as originally set out in the Project design during implementation? b) Has there been evidence of flexibility in Project management? c) Have any changes been made in response to the results based management/ adaptive management processes? d) If so, (a) which changes were made, (b) for what purpose, and (c) with what results?	• Examples of changes made in approach or strategy by management after learning new information	Interviews Desk review	Project management and relevant peers and stakeholders Project documents and reviews, other relevant docs

Judgment Criteria	Evaluation Questions	Indicator(s) proposed	Means of verification	Source of verification
Project has a functional M&E system	To what extent does the project have an effective monitoring, reporting and evaluation framework including measurable indicators, systematic and regular processes for collecting data, and feedback processes to facilitate decision making and learning?	• Project evaluation framework including indicators: - at the activity level - measurable (achievable, reportable, timely, specific)	Desk review	Project documents and reviews, other relevant docs
			Interviews	Project-selected management and staff
		• Existence of a Project M&E system, including relevant processes and mechanisms for: - monitoring - reporting - data collection & management - feedback and learning	Desk review	Project documents and reviews, other relevant docs
			Interviews	Project-selected managers and staff
Project's M&E system is used for feedback, adaptive management, and learning		• Internal learning achieved from the use of the M&E system by relevant individuals and ways they have learned	Desk review	Project documents and reviews, other relevant docs
			Interviews	Project-selected staff, managers
		• Actual use of the M&E system to change or improve decision-making/adaptive management	Interviews	Project-selected staff, managers
Stakeholder inclusiveness and collaboration	a) Who are the Project stakeholders and partners? b) To date, has Project implementation been inclusive of the relevant stakeholders and collaboration between	• Extent to which the implementation of the Project has been inclusive of relevant stakeholders and	Interviews	Stakeholders

Judgment Criteria	Evaluation Questions	Indicator(s) proposed	Means of verification	Source of verification
	different partners identified in the Project strategy? c) What means have been employed to ensure inclusiveness? (give concrete examples) d) Are there stakeholder groups that the Project strategy failed to identify? If so, (i) which ones and (ii) why?	collaboration between partners		
Donor visibility related to this Project	What evidence is there of the donors' visibility? b) Is there other evidence of the donors' visibility that relates specifically to the assignment?	• Donor visible relating to this Project	Document review	media coverage, official notices and press releases, reports and publications referring to the assignment
Outcome in absence of Project	What would be the outcome if the project did not take place?	• Perception of stakeholders of outcome in absence of project	Interviews	Stakeholders
What lessons can be drawn regarding the effectiveness for the remainder of the project		• What lessons have been learned regarding achievement of outcomes • What changes could have been made (if any) to the design to improve the achievement of the results	Interviews	Project-selected staff, managers, stakeholders
3. EFFICIENCY **The extent to which results have been delivered with the least costly resources possible**				
Project results achieved (outcomes and impacts) and justify the input and investment	To what extent are the impacts and benefits arising from the Project commensurate with the level of effort and resources expended? a) Have Project inputs been (a) of suitable quality and (b) available when required to allow the Project to achieve the expected results? b) If not, in what instances? Why was this the case? How has this adversely affected the Project? c) How the quality of the inputs is being monitored by the Projects, through which indicators?	• Overall investments (funding, time, other resources)	Desk review	Project documents and reviews, other relevant docs
		• Extent to which level of co-financing has occurred compared to that planned	Desk review Interviews	Project documents, deal flows
		• Timeline for implementation and completion of activities	Interviews	Project-selected and relevant staff
			Desk review	Project documents and reviews, other relevant docs
		• Extent to which inputs have been of suitable quality and available when required to allow the Project to achieve the expected results	Interviews	Project management staff and stakeholders
Operations are cost-effective relative to the	What are the most cost-effective areas of activities (by sector, region, or industry size)?	• Perceptions as to cost-effectiveness of program	Interviews	Project program manager(s),
		• Level of execution of program budget	Desk review	Project documents and

Judgment Criteria	Evaluation Questions	Indicator(s) proposed	Means of verification	Source of verification
outputs, and results achieved (outcomes and impacts), and their leveraging effects on investments in the targeted sectors				reviews, other relevant docs
		• Percentage of budget for management and operations (vs. other activities)	Desk review	Project documents and reviews, other relevant docs
		• Leveraging effect on investment per sector / region and large/SMEs	Desk review	Project documents and reviews, other relevant docs
Project's management structure is conducive to its objectives / Project's core management structure is effective and efficient	How appropriate and effective are Project's management structure and staffing profile in realizing a relevant, effective, and efficient Project? What changes, if any, are needed to Project's organizational structure and staffing profile to carry out its mandate?	• Evidence of clear roles and responsibilities for operational and management structure • Degree of fulfilment of goals according to results framework (over evaluation period)	Interviews	Project-selected management, including former Project managers,
			Desk review	Project documents and reviews, other relevant docs
		• Relationship between organizational structure and fulfilment of project objectives - formation or dissolution of teams or work plans in order to fulfil or drop specific business plan objectives - number of staff and time spent on administrative tasks - number of staff and time spent on knowledge or information/database management - evidence of bottlenecks or barriers to decision-making (e.g., accessibility of senior staff/managers, ease of resource management systems)	Interviews	Project-selected management, including former Project program managers,
			Desk review	Project documents and reviews, other relevant docs
		• Client/Stakeholder satisfaction with Project staff: - performance in reaching mutual goals/objectives - receptiveness/accessibility - abilities/capabilities/skills - expertise/applicable knowledge - efficiency and timeliness - other factors	Interviews	Project partners and stakeholders

Judgment Criteria	Evaluation Questions	Indicator(s) proposed	Means of verification	Source of verification
		• Perceptions of or actual levels of relative effectiveness and/or efficiency of Project's structure compared to other relevant energy sector trust funds/operational entities	Interviews	Project-selected management, including former Project program managers, partners
			Desk review	Project documents and reviews, other relevant docs
Project has an appropriate management accountability system	How effectively has Project management accountability been exercised, and how well is M&E built into programming and strategy to strengthen accountability?	• Number and type of mechanisms or systems in place for holding Project management accountable for their roles and responsibilities	Interviews	Project-selected management
		• Examples of incidents when accountability measures or systems revealed mismanagement	Interviews	Project-selected management, staff
Project's M&E system enables accountability as a part of regular programming and strategy		• Percentage of budget spent on M&E systems	Desk review	Project documents and reviews, other relevant docs
		• Evidence of use of M&E/reporting information to - make management decisions/adaptive management - inform strategy - inform programming or planning - other	Interviews	Project-selected management, including former Project program managers
		• Frequency of reporting, updating, or use of M&E systems for accountability purposes	Interviews	Project-selected management, including former Project directors,
What lessons can be learned regarding the efficiency for the remainder of the project		• What lessons have been learned regarding achievement of outcomes • What changes could have been made (if any) to the design to improve the efficiency of the project	Interviews	Project-selected staff, managers, stakeholders
4. RESULTS **What are the current actual and potential long-term, results of activities supported by the Project?**				
Progress towards Project objectives at mid-term	What ratings does the Project achieve in terms of implementation progress	• Indicators from Project framework (planned vs expected outputs, outcomes, impacts	Document review Interviews	Project documents Key stakeholders Monitoring data

Judgment Criteria	Evaluation Questions	Indicator(s) proposed	Means of verification	Source of verification
Likelihood of meeting objectives and global environment objectives	a) Is the Project likely to meet its objectives and overall results by the end of the Program? If not, why? b) What are the main barriers, if any, for the Project to achieve its objectives? c) What is expectancy to achieve global environment objectives/development objectives?	• Indicators from Project framework	Document review Interviews	Project documents Key stakeholders Monitoring data
	Are there any unanticipated results achieved or likely to be achieved?	• Number of unexpected results	Document review Interviews	Project documents Key stakeholders Monitoring data
How can the Project build on its successes and learn from its weaknesses in order to enhance the potential for impact of the initiative?		• Lessons/future direction	Interviews	Project-selected staff, managers, stakeholders
5. SUSTAINABILITY **The likely ability of an intervention to continue to deliver benefits for an extended period of time after completion**				
Sustainability integrated into Project	Are sustainability issues integrated into the design and implementation of the Project?	• Evidence/quality of sustainability strategy • Evidence/quality of steps taken to ensure sustainability	Document review Interviews	Project documents, project management staff, beneficiaries
Financial sustainability		• Evidence of likely commitments to support sectors beyond the end of the Project	Document review Interviews	Project documents, project management staff, beneficiaries
Sustainability of impact	How sustainable will the project impact be beyond the project implementation?	• Extent to which project is likely to be sustainable beyond the project	Interviews	Beneficiaries, stakeholders
Project is effective in developing internal and external partnerships to achieve objectives	How effective is the Project in building and developing internal and external partnerships to achieve its objectives?	• Resources (time, budget) spent on coordination with - client country governments - potential clients - Project partners - other stakeholders or recipients	Interviews	Project management, staff
			Desk review	Project documents and reviews, other relevant docs
		• Evidence of local ownership	Interviews	Stakeholders
		• Degree to which and nature of how external partners rely on Project to fulfil their country or local-level objectives	Interviews	Project partners and stakeholders, regional staff
			Desk review	Project documents and reviews, other relevant docs
		• Number and quality of local partnerships developed through Project	Interviews	Project partners and stakeholders, regional staff
			Desk review	Project documents

Judgment Criteria	Evaluation Questions	Indicator(s) proposed	Means of verification	Source of verification
				other relevant docs
		• Perceptions of clients, partners, and other stakeholders as to tangible development results stemming from Project activities/involvement in the energy sector of their country/region and, their ranking	Interviews	Stakeholders
Project has learned internally from its experiences	To what extent has the program learned from its experiences? a) Are there lessons to be learnt from implementation that should inform the next phase of the Project's implementation? b) If not, are there lessons that are likely to emerge? c) In what ways may these inform the Project's next phase? d) Have steps been taken to ensure that benefits from (i) Project activities and implementation as a whole and (ii) lessons learnt from other programs, are integrated and applied to the Program as a whole? e) Were formal strategic planning and knowledge management systems designed and put in place? Have these processes been followed? With what results?	• Project internal communication and feedback loops generating information useable in decision making	Desk review	Project documents and reviews,
			Interviews	Project and staff, management
		• Examples of incidences whereby Project: - took advantage of a positive model/solution and expanded on it - avoided worsening a situation/set of activities, based on new understanding/information	Desk review	Project documents and reviews,
			Interviews	Project staff
Effectiveness of communication of lessons learned	How effective has the communication of lessons learned to stakeholders been? a) Have any lessons learnt during the Project's implementation to date been communicated to (i) the relevant Project stakeholders, and (ii) other related programs and Projects? b) Who have any lessons learnt been communicated to and by what means? c) Have lessons and format been appropriate for their audience? d) Have lessons learned effectively reached their intended audience	• Extent to which lessons learnt have been communicated to project stakeholders and other related programs and projects	Interviews Document review	Project documents, project management, stakeholders
Project-initiated activities can spread to a wider set of beneficiaries	To what extent can project-initiated activities be broadened to a wider and larger beneficiary group, and be leveraged to bring about even more benefits than originally intended?	• Amount of resources (time, budget, human resources) devoted to developing stronger links between Project activities and local beneficiary groups	Desk review	
			Interviews	Projects, staff and clients, stakeholders, and partners

Judgment Criteria	Evaluation Questions	Indicator(s) proposed	Means of verification	Source of verification
		• Evidence of stakeholder interest and capacity to identify ways to broaden the beneficiary group	Interviews	Project clients, partners, and
			Desk review	Project documents and reviews, other
Project activities that achieve objectives are replicable	Which activities are most effective in contributing to stated objectives, what are the characteristics of these activities, and to what extent have they been replicated, or could they be replicated, beyond this project?	• Replication of activities with high levels of achievement toward objectives in other countries/interventions	Desk review	Project documents and reviews, other relevant docs
			Interviews	Project management and relevant
		• Perceptions of clients and other partners s to the effectiveness of those activities that were	Interviews	Project management and relevant peers and

Annex D: Bibliography / Documents reviewed

Document title or description	Author	Date
Project documents		
Promoting renewable energy based mini-grids for rural electrification and productive uses - PIF	UNIDO	24/04/09
Approved CEO Endorsement document	UNIDO	02/2012
Progress at 06/02/14 per project with revised deadlines component in excel		06/02/14
Action plan April 2014 in excel		16/04/14
Operational plan behind the action plan	Dangaye	
Revised Chad Budget Sept 2014, 2015	UNIDO	Sept 14,15
Funding related documents		
Signed Trust Fund Agreement		
Commitment letter from Government from January 2011	MPE (Ministry of Petrol and Energy)	19/01/11
Confirmation from the Secretary General about the fund commitment from April 2014	MPE	18/04/14
UNIDO letter to Secretary General signed by MD from August 2014	UNIDO	13/08/14
Agreement between UNIDO and MPE, Republic of Chad re. finance commitments	UNIDO/MPE	15/08/12
Project progress documents		
Construction and commissioning of 5 solar photovoltaic mini grid in Chad on a turn-key basis: Inception mission report	TTA	03/2012
Powerpoint presentation of inception report	TTA	March 2012

Document title or description	Author	Date
PIR June 2014 - 2015	UNIDO	June 2015
PIR June 2013 - 2014	UNIDO	June 2014
PIR June 2012 – June 2013	UNIDO	June 2013
1st progress report - TTA	TTA	Dec 2013
2nd progress report - TTA	TTA	June 2014
3rd progress report - TTA	TTA	June 2014
Back to office report (includes minutes of PSC and comments on design)	Diego Masera	08/05/2013
Back to Office report (includes discussions with communities)	Manuel Mattiat	April 2014
Back to Office report	Diego Masera Jana Imrichova	May 2014
Minutes of 1st PSC meeting in April 2013	PSC	19/04/2013
TTA powerpoint presentation to PSC	TTA	April 2013
Minutes of PSC Meeting 14/0913	MPE	Sept 2014
Minutes of May 2014 PSC meeting	MPE	10/05/14
Minutes of last 23 April 2015 PSC meeting	MPE	23/04/15
ERDET project bulletins 1 – 5 – December 2013 – December 2014	TTA	Dec 2013-14
Photos from TTA and the project		
TORs and Sub-contracts		
Purchase order for ECREEE HOMER training	UNIDO	20/08/14
Contract No. 16002596 between UNIDO and TTA for construction and commissioning on a turn-key basis of a	UNIDO	10/12/12

Document title or description	Author	Date
solar PV mini-grid		
Amendment No. 1 to Contract No. 16002596 between UNIDO and TTA	UNIDO	July 2013
Amendment No. 2 to Contract No. 16002596 between UNIDO and TTA and invoice (includes changes to payment schedule)	UNIDO	Dec 2013
Accord OUNDI – TTA 160414 (includes plans for proposing associations and tariffs to PSC and action points for construction and overground/underground cables)	UNIDO/TTA	16/04/14
Terms of Reference for construction and commissioning on a turn-key basis of a solar PV mini-grid (Annex F of above amendment)	UNIDO	
Contract No. 3000023053 between UNIDO and Sylvanus Bassounda	UNIDO	Sept 2014
Terms of Reference for the legal/regulatory work	UNIDO	May 2014
Terms of Reference for the Acquisition of Services in Organising a Homer Training Course in Tchad	UNIDO	
Schedule for visit by UNIDO for the pre-shipment inspection to TTA	TTA	Nov 2014
TOR for international regulatory expert	UNIDO	
Arrete No. 1 / MPE/SG/DE/2011 – project co-ordinator	MPE	13/01/11
ToR for National Coordinator	UNIDO	2013
Background documents		

Document title or description	Author	Date
Demand aupres du Clean Energy Centre for Chad – review of RE technologies, business models and costs for rural electrification in Chad	Toby Couture	27/08/14
National strategy for RE development	Ministry of mines, energy and water, Mali	
Schema Directeur due Secteur de L'Energie au Thcad (National Energy Sector Strategy)	Fichtner	Feb 2012
Chad law no 014/PR/99 related to the production, transport and distribution of electricity		May 1999
Chad economic figures	CIA	Diverse dates
Presentation of proposed new xx electricity sector in Senegal		
Action plan for new and renewable energy in Chad & executive summary (not yet validated)	UNDP	2014
Project co-ordination documents		
Progress and mission reports from co-ordinator to Vienna –Nov, Jul, Jun, 2014, Jan 2015	Dangaye	2014
Letters to Government re. Co-finance, procurement of TTA		