



PROJECT IDENTIFICATION FORM (PIF)
PROJECT TYPE: Full-sized project
THE GEF TRUST FUND

Re-submission Date: 27 November 2009

PART I: PROJECT IDENTIFICATION

GEF PROJECT ID: 4004 **PROJECT DURATION:** 48 months
GEF AGENCY PROJECT ID: XX/URT/09/XXX
COUNTRY: United Republic of Tanzania
PROJECT TITLE: Mini-Grids Based on Micro Hydropower Sources to Augment Rural Electrification
GEF AGENCY: UNIDO
OTHER EXECUTING PARTNERS: Ministry of Energy and Minerals, Rural Energy Agency, TANESCO
GEF FOCAL AREA: Climate Change
GEF-4 STRATEGIC PROGRAM: CC-SP3 - Promoting Market Approaches for Renewable Energy.
NAME OF PARENT PROGRAM/UMBRELLA PROJECT: N/A

INDICATIVE CALENDAR	
Milestones	Expected Dates
Work Program (for FSP)	January 2010
CEO Endorsement/Approval	March 2011
Agency Approval Date	April 2011
Implementation Start	June 2011
Mid-term Evaluation (if planned)	June 2013
Project Closing Date	June 2015

A. PROJECT FRAMEWORK

Project Objective: To promote market-based approaches to Micro hydropower based mini grids in Tanzania to augment rural electrification.								
Project Components	Type*	Expected Outcomes	Expected Outputs	Indicative GEF Financing		Indicative Co-Financing		Total (\$) c = a + b
				(\$ a)	%	(\$ b)	%	
1. Technical assessment and mapping of Micro hydropower resources in Tanzania	TA	Knowledge base on MHP resources and mapping of potential sites for demonstration established	1.1 MHP resource assessment carried out	400,000	33	800,000	67	1,200,000
			1.2 Existing MHP data-bases updated and map of potential sites developed					
			1.3 Potential sites for demonstration plants identified, and detailed studies undertaken					
2. Capacity building of relevant stakeholders in developing MHP based mini-grids.	TA	National capacity enhanced in developing, implementing and managing MHP based mini-grid projects.	2.1 Capacity of selected national technical institutions such as the University of Dar es Salam enhanced to build local technical capability in MHP technology and rural energy planning	1,000,000	56	800,000	44	1,800,000
			2.2 Experts and planners are trained in MHP project planning and methodologies for MHP based mini grid development.					
			2.3 Capacity for local manufacturing of MHP equipment and components built through transfer of technology and strengthening of local private sector fabrication facilities.					
			2.4 Quality standards for MHP installation & management formulated					

3. Viable business model for rural MH mini grid developed	TA	Capacity of local private entrepreneurs developed	<p>3.1 Develop productive activities (agro processing, rural industries etc.,) which will utilize the power generated by MHP schemes capable of ensuring sustainability financial viability of the mini grids</p> <p>3.2 Local private sector capacity to undertake MHP projects as viable business venture increased through streamlining existing financing options such as the WB credit line for RE projects and other subsidies provided by the Government.</p>	400,000	50	400,000	50	800,000
4. Demonstration of technical and economic viability of Micro hydro-power technologies	INV	Increased rural electrification due to increased share of electricity from MHP	4.1 A number of MHP plants with capacity totalling at-least 3 MW are designed, developed (10 sites with capacity ranging between 100-1000kW), and commissioned in different areas in the country.	1,400,000	23	4,800,000	77	6,200,000
5. Project management				150,000	27	400,000	73	550,000
Total project costs				3,350,000	32	7,200,000	68	10,550,000

* INV = Investment; TA = Technical Assistance; STA = Scientific & Technical Analysis

B. INDICATIVE CO-FINANCING FOR THE PROJECT BY SOURCE and by NAME (in parenthesis) if available, (\$)

Sources of Co-financing	Type of Co-financing	Project
Project Government Contribution	Grant	3,000,000
GEF Agency (UNIDO)	Grant	
Bilateral Aid Agency(ies)	Norway & Sweden	4,200,000
Multilateral Agency(ies)		
Private Sector	Unknown at this stage	
NGO		
Others		
Total Co-financing		7,200,000

C. INDICATIVE FINANCING PLAN SUMMARY FOR THE PROJECT (\$)

	Previous Project Preparation Amount (a)	Project (b)	Total c = a + b	Agency Fee
GEF financing		3,350,000	3,350,000	335,000
Co-financing		7,200,000	7,200,000	
Total		10,550,000	10,550,000	335,000

D. GEF RESOURCES REQUESTED BY AGENCY (IES), FOCAL AREA(S) AND COUNTRY(IES)

N/A. The project is for a single focal area, single country, and single GEF Agency.

PART II: PROJECT JUSTIFICATION

A. THE ISSUE, HOW THE PROJECT SEEKS TO ADDRESS IT, AND THE EXPECTED GLOBAL ENVIRONMENTAL BENEFITS TO BE DELIVERED:

The issue: Tanzania has a population of 35 million, 70% of which lives in rural areas. Less than 10% of the population has access to electricity from the national grid, this number being only 2% for the rural population. More than 50% of population lives in poverty. The poor spend more than 35% of their household income to meet their energy needs (buying kerosene, charcoal and dry cells) compared to 14.5% by the better off. This very low level of electricity access and low level of commercial energy use are the major challenges faced by the Tanzanian energy sector, and it is holding back the economy.

The Government of Tanzania has placed rural electrification high on its agenda. For that purpose the Government has established a Rural Energy Agency (REA) with a view to facilitate modern energy projects for rural areas, promote rural energy services, and provide technical support to developers. The Government has also established a Rural Energy Board and is in the process of establishing a Rural Energy Fund. On the regulatory side, standard PPA exists for small power producers. On financing side, a World Bank credit line is available for providing subsidy to renewable energy investments in Tanzania.

In line with this policy, the Government has also adopted its National Energy Policy in 2003 with the following specific objectives: (a) to develop the abundant hydroelectric potential available in the country; (b) to reduce deforestation through efficient use of woody biomass; (c) to promote renewable energy resources; (d) to promote energy efficiency and conservation; and (e) to develop sufficient human resources to facilitate the development of energy technologies.

With respect to the country's hydropower potential, Tanzania has a total installed capacity of 950 MW as of 2005, but only 561 MW of this is from hydropower – compared to a hydropower potential of 4,700 MW. So in principle Tanzania has a very good potential to attract investments into its hydropower sector. In some concentrated areas there are particularly good possibilities for hydropower, for instance in the Usambara and Pare mountains where many perennial rivers and streams with steep drops are in close proximity to villages without electricity.

However, there are several barriers to improving the rural energy situation in Tanzania of which this project will address (1) rural energy planning and implementation, through resource assessment and planning; (2) Lack of technical capacity among human as well as institutions through various capacity building activities for various target groups and institutions as well as building technical capacity in fabricating MHP turbines (3) Lack of awareness and participation through experience sharing and awareness creation.

The project: This project aims at facilitating the implementation of the national energy policy and remove the above mentioned barriers focusing on the country's small hydropower resources. The specific objectives of this project are to facilitate, in partnership with REA and the National Utility TANESCO, the creation of the enabling policy framework and the market environment to harness the abundant hydropower resources in the country. Issues related to the regulatory and institutional frameworks as well as financing issues for setting up mini-grids will be tackled. Building local capacities by means of (a) strengthening existing institutions (TANESCO, Faculty of Civil Engineering, University of Dar es Salam etc) by upgrading their technical expertise and facilities to generate Hydropower related data (river training, hydrological and topographical data acquisition, organizing trainings and information dissemination activities on MHP development and consultancy services to private developers), (b) local capability to manufacture MHP turbines (there is no local manufacturing of any type of hydropower turbines exists in Tanzania as of now) through transfer of technology (to capable local private sector who will be identified during PPG state), which may bring down the cost of MHP plants, as well as (c) improve human capacity in identifying, designing, implementing and operating MHP plants/mini grids will also be undertaken, and a total of 3 MW of demonstration small hydropower plants will be developed. Based on the reconnaissance study undertaken by TANESCO in 6 regions, about 10 sites ranging from 100kW to 1000kW will be identified and developed as demonstration sites. This represents an opportunity to meet the growing demand for electricity in rural areas and for industrial needs while reducing GHG emissions.

If successful, the GEF support will enable the Government to scale-up and replicate the project achievements across the country. As such, GEF support will ensure that (i) commercialized development of small hydropower and GHG reductions are sustained by removing technical, policy and capacity barriers; (ii) the energy service of electricity generated from renewable small hydropower sources can be used for rural livelihoods by bridging the gap in increasing access to modern energy; (iii) GEF financial commitment

along with the presence of a specialized agency like UNIDO will provide confidence for the project investors; and (iv) having a GEF-UNIDO partnership working for project development will raise the people's trust in such technologies and help in their enhanced use and replication.

The global benefits: By supporting the development of small, mini and micro hydropower potential in Tanzania, this project will contribute to reduction in the GHG emissions from the country's energy sector since most of the demand is currently met through fossil fuel use. It is envisaged that by the end of the project, about 4 MW of additional SHP capacity will be added, **which will lead to reductions of at least 12,600 tons CO₂ emissions per year (Emission = 3 MW * 7,000 hours/year*0.75 (load factor) *0.8 t CO₂/MWh =12,600 t CO₂/year).** As discussed above, if successfully implemented, the replication potential of this project is very high, so that further reductions in CO₂ emissions can be expected. Exact quantification of the global environmental benefits will be undertaken during the PPG phase.

B. CONSISTENCY OF THE PROJECT WITH NATIONAL/REGIONAL PRIORITIES/PLANS:

This project is in line with the strategies/directions of the National Energy Policy as regards to energy poverty reduction, which include: (a) promoting affordable and reliable energy supplies throughout the country; (b) reforming the market for energy services and establishing an adequate institutional framework; (c) enhancing the development and utilization of indigenous and renewable energy sources and technologies; (d) taking adequate account of environmental concerns in all energy activities; (e) promoting energy efficiency and conservation in all sectors; (f) increasing energy education and building gender balanced capacity in energy planning, implementation and monitoring. The project will be consistent with all these strategies.

In summary, this project will support the Government's determination to attain sustainable development and is totally aligned with the national priorities.

C. CONSISTENCY OF THE PROJECT WITH GEF STRATEGIES AND STRATEGIC PROGRAMS:

The project is designed to promote small hydropower (SHP) based mini-grids in Tanzania through market approaches, and is thus consistent with the GEF Climate Change focal area strategic programme SP-3: Promoting market approaches for Renewable Energy.

As described in the climate change focal area strategy, the proposed project will contribute positively to the Renewable Energy market transformation process, which will result in reduced fossil fuels use in the power sector and GHG emissions reduction. The demonstration of viable and sustainable SHP projects will enable the Government to further establish the right policy and regulatory framework, and contribute to climate change mitigation through subsequent investment programmes. The growing demand for reliable and cost effective electricity by the industrial, commercial and residential sectors due to growth, as well as the wide demand supply gap and the important share of fossil fuels in the electricity generation mix, add relevance to the project. **It is envisaged that private sector participation in manufacturing of micro-turbines and Micro Hydro project development related capacity building will be enhanced as a result of the demonstration projects and technology transfer envisaged under this project.**

D. THE TYPE OF FINANCING SUPPORT PROVIDED WITH THE GEF RESOURCES:

The GEF resources will be used to support the development of mini-grids in terms of background studies, feasibility studies, engineering designs and partial support in procurement of equipment, thereby demonstrating the viability of MHP based mini-grid systems. **Considerable part of the GEF contribution will be used for building local capacity (of people, institutions and manufacturing capability) for MHP development.** Some of the resources will also be used for providing technical assistance in capacity building especially (1) in the mapping of SHP resources; (2) strengthening of **technical** institutions (3) creating local capacity in fabrication of small capacity turbines (100 kW range); (4) creating awareness **and experience sharing.** **Government of Tanzania is keen to co-finance the project through involvement of REA and donors like NORAD and SIDA who have already committed support to the Government for Small Hydro development could also provide part co-financing through REA.**

E. COORDINATION WITH OTHER RELATED INITIATIVES:

There are currently two GEF funded projects being implemented by UNDP and WB respectively with which the proposed project is complementary and with which coordination and synergies will be sought. They are (1) transformation of the rural photovoltaics (PV) market (2004-2009), being implemented by UNDP in cooperation with the Ministry of Energy and Minerals which aims at reducing Tanzania's energy-related CO₂ emissions by introducing solar PV electricity as a substitute for kerosene used for lighting in off-grid rural areas, and at slowing down the rate of additional diesel-based captive generation or grid extension schemes to the non-electrified

areas; (2) “Energy Development and Access Expansion in Tanzania”, implemented by WB aims at improving the quality and efficiency of the electricity service provision and at establishing a sustainable basis for access expansion. This project has an on grid component which supports TANESCO in expanding the grid (T &D, PV Market development and TA to REA). The component B of the WB project deals with off grid investments with its subcomponent 1 intends to invest in small power generation from small hydro, biomass and PV. Discussions with the WB project team confirmed that the proposed UNIDO project will be strategic and will help develop SHP sector in Tanzania which can then be scaled up by investments envisaged in the TEDAP (WB Project).

F. THE VALUE-ADDED OF GEF INVOLVEMENT IN THE PROJECT:

Without the GEF project, the “business as usual” scenario will involve only gradual increases in renewable energy based rural electrification in Tanzania. Funding of this project could be difficult without GEF support considering the barriers present in the country in developing renewable energy based mini-grid projects and related investments, made worse by the current economic situation. As in many developing countries, the public sector in Tanzania will not be able to finance all the investment needed to satisfy growing energy demand requirements. Thus, it is important to work with international assistance agencies in order to remove existing barriers, mobilize the necessary technical support and the financial means necessary for project implementation by the private sector. *As per information from TANESCO, investment cost of 1 MW diesel power plant is USD 1 Million and that of MHP varies between USD 2- 5 million based on specificities of sites. GEF project funding of USD 3.35 million will, therefore provide minimum incremental cost for establishing 3 MW capacity of MHPs (based on USD 2 mil/MW of MHP) and place the Government in a better position to mobilize co-financing for the project.* The business-as-usual scenario would limit Tanzania’s ability to contribute to the achievement of MDGs, especially environmental sustainability and poverty reduction. Therefore, GEF support will be instrumental to the deployment of small hydropower based energy systems in Tanzania in support of Government initiatives to increase the energy situation in the country.

As shown above, the project fits into the GEF-4 program and the overall strategy of GEF to help developing countries fund projects and programmes that protect the global environment. Global environmental protection does not rank high among Tanzania’s policy priorities due to urgent socio-economic needs of its population. Thus funds for such projects are not easily available and there is necessity for external funding by GEF.

G. RISKS THAT MIGHT PREVENT THE PROJECT OBJECTIVE FROM BEING ACHIEVED, AND RISK MITIGATION MEASURES THAT WILL BE TAKEN:

Component	Risk	Proposed Mitigation Measure	Risk Level
Technical risks	The SHP based mini-grid technologies are not technically viable for electricity generation in rural areas	Detailed techno-economic feasibility studies to be carried out on identified sites and mini-grids established at proven sites.	Low
Economic and financial risks	The SHP mini-grids are not financially viable in rural areas.	Focus on productive uses powered by the energy produced, so that the energy generated is used to create value/service for the communities <i>by private sector, which can spread the benefits to the communities.</i>	Moderate
Market risks	Increased investments on renewable energy based mini-grids do not provide high enough returns Lack of funding for replicating the pilot projects.	Involvement of private sector partners will ensure the financial viability and therefore rate of return of the projects. Also focus on providing energy for productive uses. Mobilize stakeholders’ participation, especially IFIs <i>and private sector</i> , at an early stage and in the project implementation process.	Moderate
Policy, regulatory and institutional framework	Policy and regulatory as well as institutional framework not in place	An energy policy and a renewable energy master plan both exist in Tanzania, and the institutional mechanism has been created.	Low
Sustainability	SHP plants do not follow sustainability principles	Detailed techno-economic studies and provision for productive uses in the beneficiary communities will ensure sustainability of the project	Low

H. THE EXPECTED COST-EFFECTIVENESS OF THE PROJECT:

The cost of emissions reduction per tonne of CO_{2eq} of such interventions is not yet determined. Such an exercise will be undertaken during the PPG stage. Nevertheless, the project is considered to be cost effective intervention for GEF due to the CO₂ emissions reduction potential from enhanced use of small hydropower based electrification in Tanzania. Currently, most of the electricity generation in Tanzania is small-scale diesel based individual generation. In this case, the impact in terms of emissions reduction for the coming years will be important. For a GEF contribution of US\$ 3.35 million (incremental cost is USD 3 -12 Million) , this project will directly result in at least 3 MW of additional installed capacity based on SHP technologies, eliminating approximately 12,600 tonnes of CO₂ per year, assuming 75 % capacity factor. So the project would have a cost of approximately US\$ 14/tonne of CO₂ mitigated assuming a life span of 20 years which is very cost effective. However, with a large potential existing for promoting renewable energy markets in the country as well as in the region, the project is expected to result in scaling up of SHP based mini-grids, which will make it a much higher impact GEF intervention. The pilot projects established by the project will increase the local capacity in such a way that further future interventions will be likely.

I. THE COMPARATIVE ADVANTAGE OF UNIDO:

The project is a technical assistance/capacity development intervention that fits within the Climate Change focal area strategic programme SP-3. The GEF Council paper “Comparative Advantages of the GEF Agencies” (GEF/C.31/5rev.1) recognizes a comparative advantage to UNIDO in this strategic programme.


PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT AND GEF AGENCY

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT ON BEHALF OF THE GOVERNMENT:

NAME	POSITION	MINISTRY	DATE
Mr. E. K. Mugurusi	Director of Environment Vice President's Office	P.O. Box 5380 Dar Es Salaam United Republic of TANZANIA	15 October 2009

B. GEF AGENCY CERTIFICATION

This request has been prepared in accordance with GEF policies and procedures and meets the GEF criteria for project identification and preparation.

Agency Coordinator, Agency name	Signature	Date (Month, day, year)	Project Contact Person	Telephone	Email Address
Mr. Dmitri Piskounov Managing Director UNIDO GEF Focal Point			Mr. Jossy Thomas	+43 -1- 26026-3727	j.thomas@unido.org