

UGANDA  
Energy for Rural Transformation Project

## Project Appraisal Document

Africa Regional Office  
AFTEG

<b>Date:</b> October 18, 2001 <b>Country Manager/Director:</b> James W. Adams <b>Project ID:</b> P069996  <b>Lending Instrument:</b> Adaptable Program Loan (APL)	<b>Team Leader:</b> Arun P. Sanghvi <b>Sector Manager:</b> M. Ananda Covindassamy <b>Sector(s):</b> CC - Telecommunications & Informatics, DI - Private Infrastructure, PY - Other Power & Energy Conversion <b>Theme(s):</b> Environment; Rural Development; Energy; Private Sector; Telecom & Informatics <b>Poverty Targeted Intervention:</b> Y
<b>Global Supplemental ID:</b> P070222 <b>Focal Area:</b> G <b>Supplement Fully Blended?</b> Yes	<b>Team Leader:</b> Arun P. Sanghvi <b>Sector Manager/Director:</b> M. Ananda Covindassamy <b>Sector(s):</b> CC - Telecommunications & Informatics; PY - Other Power & Energy Conversion

Program Financing Data							
APL	Indicative Financing Plan				Estimated Implementation Period (Bank FY)		Borrower
	IBRD US\$ m	%	Others US\$ m	Total US\$ m	Commitment Date	Closing Date	
<b>APL 1</b> Loan/ Credit	49.15	39.9	74.06	123.21	11/15/2001	08/31/2006	Government of Uganda
<b>APL 2</b> Loan/ Credit	45.00	37.5	75.00	120.00	11/15/2005	11/15/2008	Government of Uganda
<b>APL 3</b> Loan/ Credit	71.00	36.2	125.00	196.00	11/15/2008	11/15/2011	Government of Uganda
<b>APL 4</b> Loan/ Credit							Government of Uganda
<b>Total</b>	165.15		274.06	439.21			

☐ Loan      ☒ Credit      ☒ Grant      ☐ Guarantee      ☐ Other:

**For Loans/Credits/Others:**  
**Amount (US\$m):** 49.15  
**Proposed Terms (IDA):** Standard Credit  
**Years to maturity:** 40

<b>Financing Plan (US\$m):</b>	<b>Source</b>	<b>Local</b>	<b>Foreign</b>	<b>Total</b>
BORROWER/RECIPIENT		7.20	0.00	7.20
IDA		3.00	46.10	49.10
FOREIGN SOURCES (UNIDENTIFIED)		0.00	2.50	2.50
BILATERAL AGENCIES (UNIDENTIFIED)		1.50	5.40	6.90
FOREIGN PRIVATE COMMERCIAL SOURCES (UNIDENTIFIED)		24.60	20.80	45.40
GLOBAL ENVIRONMENT FACILITY		3.00	9.10	12.10
<b>Total:</b>		39.30	83.90	123.20

**Borrower/Recipient:** GOVERNMENT OF UGANDA

**Responsible agency:** MULTIPLE AGENCIES

Private sector, Ministry of Energy and Mineral Development, Ministry of Local Government, Ministries of Agriculture, Health, Education, Water, Uganda Communications Commission (UCC)

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**Estimated disbursements ( Bank FY/US\$m):**

<b>FY</b>	2002	2003	2004	2005	2006			
<b>Annual</b>	2.00	6.00	5.00	11.50	21.65			
<b>Cumulative</b>	2.00	8.00	13.00	24.50	46.15			

**Project implementation period:** 2002 - 2006

**Expected effectiveness date:** 03/15/2002 **Expected closing date:** 08/31/2006

OCS APL PAD Form: Rev. March, 2000

## A. Program Purpose and Project Development Objective

### 1. Program purpose and program phasing:

While Uganda's economy has consistently registered high economic performance, with an average real rate of growth of about 6.9 percent since 1990/91, and an average annual increase in real per capita income of 3.7 percent over the last decade, development in rural areas has lagged well behind urban areas. High growth performance has raised living standards, but poverty remains pervasive and extensive; much of Uganda's rural population, about 85% of the national population, remains isolated and has not yet received or seen the benefits of commonplace modern goods and services; and, rural growth prospects are constrained by a lack of, *inter alia*, adequate physical infrastructure and integration with regional, national and international markets.



*The bulk of Uganda's estimated 2,000+ trading centers, whose numbers are rising with population and economic growth, are still unelectrified - like this one Kisiizi in Southwestern Uganda. Moreover, lack of modern information/communications channels - which need electricity to function - excludes rural communities from the modern world and impedes the ability of rural enterprises to grow through better integration with provincial and national markets.*

**The purpose of the proposed long-term program is to develop Uganda's rural energy and information/communication technologies (ICT) sectors, so that they make a significant contribution to bringing about rural transformation, i.e., these sectors facilitate a significant improvement in the productivity of rural enterprises as well as the quality of life of rural households. For this to happen,**

- The conventional model of government-led rural electrification, which has generally not been in successful in sub-Saharan Africa, has to be replaced by a program of private-sector led, commercially-oriented rural electrification that considers all supply options, not just main grid extension, with investment decisions at the margin - "the last dollar" - made on a commercial basis, while affordability and equity considerations are taken care of by targeted and efficient subsidies (see section B2b).
- The rural energy and ICT sectors have to selectively build and exploit synergies between

cross-sectoral assets in energy and ICT on the one hand, and, on the other hand with end-user sectors such as health, education, agriculture, water and SMEs, (see section B3), while avoiding unnecessary inter-sectoral linkages that may spread implementation difficulties in one sector to other sectors also (see section F1).



***Most of Uganda's 1,500+ rural health clinics - Health Centers II, III, and IV - are unelectrified and lack modern communication facilities. Electricity and ICTs can help improved the health care service quality and timely response. For example, lighting would benefit night time childbirth and emergency surgery, and energy for simple laboratory tests as well as proper syringe sterilization would reduce transmission of infectious diseases such as HIV and hepatitis. Telemedicine and communications can enable life-saving medical advice on an ongoing or as-needed basis (see Annex 2 for details).***

These linkages are clearly in line with the wishes of the Government and the people. For example, various senior central and local leaders have urged the project team to be aggressive in developing them; Uganda's *Plan for Modernization of Agriculture* takes account of this project's contribution to acceleration of rural electricity access; and senior officials in the linked Ministries have incorporated these linkages into their respective mainstream activities.



***Following its successful universal primary education program, Uganda is facing an increasing demand for secondary education, where electricity and ICTs can greatly facilitate learning, particularly in vocational and technical schools (see Annex 2 for details).***



Uganda is well-endowed with renewable energy resources, whose development would contribute to environmental protection as well as rural transformation, but little progress has been made so far in utilizing them (with the notable exception of large-scale hydroelectric power generation on the Nile). **The global purpose of the proposed long-term program is to contribute to global environment protection by reducing greenhouse gas emissions;** it is expected that the development of renewable energy would also make a significant contribution to rural transformation. The proposed project is the first: (i) Bank-wide, under the Global Environment Facility (GEF)/World Bank Renewable Energy Strategic Partnership, which aims to support client country renewable energy approach through a programmatic, multi-project approach parallel to the Bank's APL, and (ii) in the Bank's sub-Saharan Africa Region to utilize the newly launched Prototype Carbon Fund (PCF), which, *inter alia*, funds projects that produce greenhouse gas emission reductions which could, in the future, be traded internationally under schemes such as the Kyoto Protocol.



***Sugar mill power generation will benefit small-plot farmers, who will supply additional cane for sugar production and power generation. The use of bagasse for power generation will eliminate open field burning of bagasse, which, at present, amounts to more than 50 truckloads per day (see Annex 2 for details).***

**Phasing:** At present, Uganda lacks both the capacity and an appropriate institutional framework for the type of commercially oriented rural electrification/ICTs and renewable energy development envisaged in this APL, and upon which a large-scale program can be built. The ten-year APL will be divided into three tranches, roughly equal in terms of time; the first phase would start small in terms of investment, while in parallel building the necessary capacity as well as the institutional and policy framework, and the pace of investments would pick up in the second and third phases.

- **First phase: *Development of requisite framework and limited investments***

The central objective of the first phase is to put in place “on-the-ground” a functioning conducive environment and related capacity for commercially oriented, sustainable service delivery of rural/renewable energy and ICTs. In the energy sector, there would be limited investment, treating each sub-project on a case-by-case basis, to test (and refine, as necessary) and prove the readiness of business models and associated support systems for commercially oriented rural electrification and for meeting essential community needs, for scaled-up delivery in subsequent phases. For the ICT sector, where the institutional framework is relatively more ready, the main activities will be support for the Government's program for accelerated rural access to basic telephone service and the spread of Internet to district capitals, with a few pilot telecenters in deep rural areas.



***This project will provide subsidies and facilitate commercial debt finance for an IFC-sponsored rural electrification scheme in Bushenyi and Rukungiri districts to provide power from a mini-hydro power plant to about 5,000 residential, commercial, institutional, and small industrial clients, such as this flour mill, which now uses a diesel generator (see Annex 2 for details).***

To achieve this, the project will:

- develop financial mechanisms to:** (a) activate efficient and effective mechanisms (Rural Electrification Fund {RE Fund} and Rural Communications Development Fund {RCDF}, both of which are already provided for in the law) for transfer of grants - from a variety of sources including bilateral donors - to subsidize initial capital investments by service providers in

commercially unviable areas, and (b) get the program going, provide financial instruments to support term financing by local financial institutions on commercial terms for private sector enterprises;

- (ii) **provide business development support services, including techno-economic information, to potential private sector participants:** Uganda's private sector, particularly in the energy sector, lacks adequate experience with the development of financable business plans as well as their implementation for service provision in rural areas. These support services would be provided to potential energy sector participants by existing facilitating entities, such as the Private Sector Foundation, on a "business-to-business" cost-sharing basis;
- (iii) **provide technical assistance and capacity building and training** appropriately targeted to relevant public sector institutions (central and local) including a to-be-established Rural Electrification Board, in support of their roles as enablers in policy setting, promotion, regulation, and monitoring/evaluation of commercially-oriented rural electrification and ICTs, and to effectively operationalize cross-sectoral linkages necessary rural transformation (see section C2).
- (iv) **facilitate community discussion and mitigation of concerns** about the nature and scope of commercially-oriented service provision of electrification and ICT services. The agents for this would be community-based organizations and NGOs.

While the above activities are also broadly applicable to **renewable energy**, some additional issues related mainly to renewable energy would also be covered in the first phase. In particular, a specific regulatory issue is the establishment of the contractual framework and rules/obligations for wheeling power over the main grid for third party sales, related pricing, penalties/remedies for non-performance, etc. (see section B2, *Government strategy*). The technical assistance and capacity building are in line with the principles of the GEF-Bank Strategic Partnership for Renewable Energy: (i) develop a strategy and implementation plan for building the capacity of in-country intermediaries to identify, develop, appraise and move towards financial closure renewable energy investments, (ii) prepare a renewable energy resource information collection and dissemination system that provides reliable data that enables interested private sector investors to initiate their own assessment of potential projects; and (iii) activities to help reduce the gap in solar photovoltaic product prices, quality and range by moving Uganda in the direction of international best practices, as applicable to Uganda.

- **Second phase: *Accelerating/building momentum for investment and continuing capacity building***

The central objectives of the second phase would be to:

- (i) **accelerate investments and increase the regional coverage** by shifting from the case-by-case approach of the first phase to processing sub-projects through the institutional framework, with continuing business development assistance, including making available generic packages, which individual entrepreneurs would tailor to their particular situation, of proven, low-cost technologies, workable financing modalities, and guidelines for community participation/acceptance developed in the first phase. The present ICT rural access objectives (see section B2a) are expected to fully met by the end of Phase 2.
- (ii) **fine tune and strengthen the institutional framework** in light of any difficulties encountered by

sub-project developers, and increase the extent of decentralization in terms of responsibilities for program support and management, monitoring, and expansion,

- (iii) **mainstreaming of successful pilots**, with any necessary adjustments, undertaken in the first phase, and implement fresh pilots that reflect fresh opportunities as well as the experience with earlier pilots.

The activities specific to renewable energy would follow from those initiated in the first phase, and would consist of building in-country capabilities, resource data dissemination, and continuing dissemination and promotion of international best practices.

- **Third phase: *Rapid scale-up and consolidation of institution build-up***

The third phase's central objective would be to shift the focus to exponential growth in investments so as to reach the Government's long-term targets for rural electrification and renewable energy development, with rural transformation facilitated by scale-up of the successful pilots from the earlier phases. While capacity building would continue, its focus would shift from fresh initiation to consolidation of the outcomes of the first and second phase activities. The *ERT* program would be fully operational on a national scale and functioning in a highly decentralized mode.

## **2. Project development objective:** (see Annex 1)

The objectives of the proposed project (Phase 1) have been discussed above.

## **3. Global objective:** (see Annex 1)

The global objective has been discussed above.

## **4. Key performance indicators:** (see Annex 1)

The key performance indicators for the **ten-year program** relate to the: (*indicators related to GEF-supported activities are shown in italics*).

- Number of homes, enterprises, public institutions (health clinics, schools, water supply facilities), trading centers, and communities with increased access to modern energy/ICTs;
- Number of people benefiting from improved delivery of health, education, and water services;
- Employment/economic gain due to SME participation in the project;
- *Sales of solar pv household and institutional systems*
- *Price reduction in solar PV product market, improvement in product, and increase in the range of product availability;*
- *Increase in the power generated from renewable energy sources (excluding large scale hydroelectricity);*
- *Increase in local capacity for renewable energy development.*

The key performance indicators for the **project (Phase 1)** relate to the: (*indicators related to GEF-supported activities are shown in italics*)

## **Energy sector**

- Establishment of regulatory system, satisfactory working of Rural Electrification (RE) Board, RE



- Agency and RE Fund, wheeling system and procedures;
- Workable financial intermediation mechanism for rural electrification;
- Satisfactory functioning of independent grid rural electrification operations;
- Satisfactory functioning of energy systems provided to agriculture-linked users, clinics, schools, and water facilities;
- *Amount (MW) of renewable energy power generation facilities constructed, GEF share in total cost;*
- *Volume of sales of solar pv systems to households and institutions, GEF share in total cost;*
- *Decline in prices of solar PV products;*
- *Status of long-term renewable energy capacity building strategy and action plan, including financing of recurrent costs of renewable energy projects and institutional arrangements;*
- *Clear evidence of Government commitment to a long-term renewable energy development program*

## ICT sector

- Number of public telephones installed in previously unserved sub-counties.
- Number of private telephone subscribers in previously unserved sub-counties.
- Number of District Headquarters with Internet POP and public Internet access facility.
- Number of private Internet subscribers outside Kampala.
- Number of rural telecenters established in 'vanguard institutions'.
- Average cost per public telephone installed.
- Average cost per Internet POP and public Internet access facility.
- Average cost per rural telecenter.
- Quality of service parameters for rural operators.
- Average cost per minute for various services in rural areas.
- Ratio of private investment to government subsidy for public telephones.
- Ratio of private investment to government subsidy for Internet POPs.
- Ratio of private investment to government subsidy for rural telecenters.

A description of the project's Monitoring and Evaluation program is given in Annex 2.

## B. Strategic Context

### 1. Sector-related Country Assistance Strategy (CAS) goal supported by the project: (see Annex 1)

**Document number:** 20886-UG

**Date of latest CAS discussion:** 30 Nov. 2000

#### 1a. Global Operational strategy/Program objective addressed by the project:

The most recent CAS, presented to the Board in November 2000, seeks to build on the 1997-2000 CAS by continuing to focus on poverty reduction through sustained growth. Its over-arching objective is to support Uganda's economic transformation and poverty reduction strategy spelled out in Government's Poverty Eradication Action Plan (PEAP)/Poverty Reduction Strategy Paper (PRSP).

The Poverty Reduction Strategy is based on four key pillars:

- **directly increase the ability of the poor to raise their income.** The PRSP explicitly supports the proposed project: "Energy for the poor will be promoted by encouraging the use of more efficient

cooking technologies and by smart subsidies for rural electrification, which will encourage entrepreneurs to invest in power infrastructure in rural growth centers. This will make it easier for the poor to have their output processed, increase their effective access to the market; it will also enable more households to gain access to electricity in their homes.” In addition, as part of the cross-sectoral links, this project will help meet the energy and ICT needs of the *Plan for Modernization of Agriculture* (see Annex 2 for details).

- **directly increase the quality of the life of the poor.** The PRSP has targeted the improved delivery of public education, health, and potable water and sanitation services to improve the quality of rural life; *the proposed project has developed appropriate cross-sectoral links with these sectors to facilitate improved service delivery.* Within the education sector, the Government plans to continue to emphasize quality universal primary education, while developing a secondary education, including adult literacy, strategy; in the health sector, the core of the Health Policy and Health sector Strategic Plan is the *minimum health package*, while a National Strategic Framework will guide the work to control HIV/AIDS; and for the water sector, the goal is sustainable provision of accessible, safe water and sanitation facilities to the entire rural population (see Annex 2 for details).
- **create an enabling environment for economic growth and structural transformation.** The PRSP is focused on *macroeconomic stability, macroeconomic incentives, equitable and efficient collection and use of public resources, and removal of constraints on private sector competitiveness.* Within the energy sector, three projects are being undertaken to alleviate key infrastructure constraints to development (see Section B2).
- **ensure good governance and security.** Good governance and security are essential for making progress on the first three pillars. The actions included under this pillar are: *improving public service delivery and decentralization, reducing corruption, ensuring law and order and security, and providing disaster management.*

### **1b. GEF Operational Program addressed by the project:**

The proposed project is the first one under the newly-established GEF/World Bank Strategic Partnership for Renewable Energy. The project is fully consistent with the GEF Operational Program 6: *Promoting renewable energy by removing barriers and reducing implementation costs.*

## **2. Main sector issues and Government strategy:**

### **2a. Power sector reforms and capacity additions on the main grid**

The Uganda Electricity Board (UEB) was established in 1948 as a quasi independent vertically integrated monopoly to generate, transmit, distribute and supply electricity within Uganda and other countries in the region. UEB has for long suffered from poor financial performance and operating efficiency, low productivity, inadequate funds for required investments, low tariffs, poor collection, and high losses. As a result, UEB is in a weak position and, by normal standards, close to insolvency.

**UEB unbundling:** Realizing the negative impact on economic growth of the weakness of the power sector, Government approved a power sector restructuring strategy in June 1999. The strategy entails the unbundling of UEB's generation, transmission, and distribution businesses into separate companies, the establishment of a legal and regulatory framework necessary for private sector participation, and the

creation of an independent power sector regulator. The Bank is supporting the Government through the *Privatization and Utility Sector Reform and Power IV Projects*.

In March 2001, the Government divided UEB into three independent corporate entities, one each for generation, transmission, and distribution. The division of UEB into these entities, also affected the allocation of the former UEB's assets. The Government has re-allocated these assets according to the requirements of the 1999 Electricity Act. As a result:

- the Distribution Company now owns all power supply assets operating at 33 kV and below, along with assets associated with the retailing of electricity.
- the Transmission Company owns all assets operating above 33 kV.
- the Generation Company owns the hydro power stations.

During a transitional period, the UEB Statutory Corporation will retain some liabilities that the Government could not delegate to the successor companies without the prior permission of counter-party to the contract (for example some multilateral and bilateral long-term debt). Upon settlement of these liabilities, or their delegation to one of the successor companies with permission of the counter party, UEB will cease to exist, according to the 1999 Electricity Act. In addition to the unbundling of UEB into separate generation, transmission, and distribution companies, the restructuring policy requires the privatization of the generation and distribution businesses through the establishment of long-term concessions. Under concession arrangements the existing assets will remain in public ownership but the private companies will have the right to operate and expand them. The distribution concession is expected to be awarded by November 2001.

Following the operational improvements due to the availability of additional electricity from the Kiira station (formerly Owen Falls Extension), the ERA authorized a 70 percent increase to the average level of tariffs, effective June 1, 2001, which raised the average tariff revenue from about US 5.6¢/kWh to US 9.5¢/kWh. At the same time, the ERA also approved to the tariff structure that removed cross subsidies between different consumer groups, most notably from industrial to residential consumers; the new tariff structure should provide better incentives for suppliers to extend electricity service to rural areas. The ERA also approved an automatic tariff adjustment mechanism to prevent the erosion of the tariff due to foreign exchange rate fluctuations and domestic inflation. Under this mechanism, the Distribution Company can adjust the retail tariffs quarterly on the basis of an ERA endorsed formula.

**Inadequate and Unreliable Electricity Supply.** Inadequate and unreliable electricity supply caused by shortage of generating capacity is stifling economic growth. Recent surveys indicate that the quality and adequacy of power supply is perceived by private sector managers as the most binding constraint to private investment.

**Strategy:** Government's long-term strategy is to develop Uganda's large hydro power resources through Independent Power Producers (IPPs), in particular, the Bujagali Private Hydropower Project which would build and operate a 250 MW run-of-the-river power plant on a Build-Own-Operate-Transfer (BOOT) basis at Bujagali Falls in Jinja Province, as well as construction of transmission lines and associated substations. The US\$530 million Bujagali project, expected to come online in 2005 (assuming financial closure is achieved by mid-2001), would be partly funded by IFC, with the support of an IDA Partial Risk Guarantee. This project would also be the vehicle through which broad-ranging reforms in the power sector would be effected.

To meet the growing demand until Bujagali is commissioned, UEB is constructing a new hydroelectric

generation plant, known as the Kiira power station, adjacent to, but not connected to the existing Owen Falls plant. The plant is designed for 5 x 40 MW generating units. The *Third Power* project financed the constructing a new dam, a power house, a diversion canal, a spillway, civil works for generating units 11 through 15, and the installation of 80 MW (Units 11 & 12) of generating capacity. The Swedish International Development Agency (SIDA) and Norwegian Agency for Development Corporation (NORAD) are financing the installation of Unit 13. The addition of this unit by the end of 2002, will increase the installed system capacity to 300 MW.

Through the *Power IV* project, the Government plans to install the remaining two units to complete the Kiira plant. Since the civil work structures are already in place, these two units can begin operation with a short lead time. The units will provide 80 MW of additional capacity.

The additional power will reduce - but not eliminate - the need for electricity rationing before the first IPP comes on-line. A demand forecast recently prepared for the Government by EdF indicates that demand will outstrip supply until Bujagali comes on stream. To further reduce the supply deficit, additional generating capacity will be needed for example from small renewable energy sources, such as sugar mills, that are close or already connected to the main grid.

## **2b. Low rural access to electricity.**

In Uganda today, with a population of about 22.6 million, an estimated 4.5 million households out of a total of about 4.7 million, remain “in the dark,” without access to electricity. The overwhelming majority of these unserved households are in the rural areas. **Only an estimated 5% of the total population - and less than 1 percent of the rural population - has access to grid supplied electricity;** Uganda currently has one of the lowest per capita electricity consumption (44 kWh/year) in the world (India 300, China 580, USA 11,000 in 1996). About 72% of the total grid supplied electricity is consumed by 12% of the domestic population concentrated in the Kampala metropolitan area, and in the nearby towns of Entebbe and Jinja.

**Adverse impact.** The rural areas are seriously constrained by the lack of access to electricity. The potential for rapid and broad-based rural economic growth and job creation is being seriously constrained by the lack of adequate investment for the provision of rural infrastructure services, of which electricity is a key component. Further, the quality of rural life is cramped by lack of electricity, particularly as rural public institutions such as health, educational and water facilities would be able to provide better services if they had access to electricity.

### ***Need for a paradigm shift.***

**Limited future impact of a restructured Uganda Electricity Board (UEB) in rural areas.** UEB today has well under 200,000 customers, the majority of whom, about 128,000, are in the urban areas. At present, UEB connects well under an additional 10,000 customers per year, which implies that Uganda is losing the access race, as population growth at the rate of 2% per year which would add 90,000 or more new households per year.

Even under the best of circumstances, with a restructured UEB and its revitalized off-springs, the rural access picture is unlikely to improve perceptibly without a paradigm change. For instance, under the optimistic assumption that the number of rural households connected to the main grid would increase at a sustained, compound annual growth rate of 15% over 2001-2010, the total number of rural households connected to the main grid would increase from about 30,000 in 2001 to about 125,000 in 2010. This would imply a rural access rate of about 3% based on the current rural population, and much lower once



population growth and other demographic changes are taken into account.

The irony is that by various indicators of revealed preference, a substantial segment of the unserved rural firms and households are willing and able to pay significant sums for electricity. Some rural businesses have resorted to self-provision of electricity, at a unit cost that is far higher than would prevail in an organized, commercial delivery system. Most rural businesses and households simply make do without electricity or have devised make-shift arrangements, which are vastly inferior substitutes for electricity, again at high unit costs.

It is important to recognize that an increase in electricity by itself will not lead to transformation of rural areas in a timely manner. For this, it is critical to be *on both sides of the meter*, i.e., work with potential consumers, particularly rural enterprises and rural public institutions, and not just rural households, so that they begin to utilize electricity once it becomes available, as this would lead to accelerated income generation and improved service delivery by end-user sectors such as health, education and water.

It follows that a paradigm shift in the organization and approach used hitherto in rural electrification is needed to meet Uganda's aspirations for off-farm led economic growth along with increases in the rural living standards.

**Strategy.** The government has adopted, in consultation with the Bank, a commercially-oriented approach towards rural electrification, with the government playing the role of a market enabler. The Government has provided the Bank with a Letter of Sector Development Policy which takes as its basis a Rural Electrification Strategy Paper prepared by the Ministry of Energy and Mineral Development with assistance from the Bank (see Annex 12). The main elements of the policy platform to support implementation of this strategy are:

(i) **Level playing field for private sector participants.** This implies a market/sector structure that will:

- Permit private sector entry for supply of electricity - generation, transmission, distribution/retailing - from the interconnected grid system as well as stand-alone, independent mini-grid systems. *(Already provided for in the Electricity Act of 1999).*
- Ensure fair competition for all suppliers with respect to UEB and its successors, in particular, all necessary steps will be taken to ensure that UEB does not have an unfair advantage over potential private sector participants in competing for distribution/retailing of electricity purchased in bulk from the UEB-operated grid system. *(To be implemented as part of power sector reforms)*

(ii) **Enabling regulatory framework.** There is a need for a suitable regulatory framework that has:

- Clear separation of responsibilities of: (i) planning, monitoring, policy setting, licensing and permits, establishing/promulgating regulations, (ii) compliance ("regulator"), and (iii) conflict/resolution, arbitration, and adjudication in cases where an involved party wishes to appeal a finding of the regulator. *(Already provided for in the Electricity Act of 1999)*
- "Light-handed regulation" procedures and processes for small, stand-alone grid-based power system systems. *(Already provided for in the Electricity Act of 1999, with details to be developed during project implementation by ERA).*

(iii) **Cost recovery and cost-based tariffs**, to facilitate private entry and local initiatives:

- The Government has agreed that consumers in different parts of the country will pay different retail tariffs *with the exception that there would be a uniform tariff on the existing grid*, and that the tariffs for some consumers will be significantly higher than for others, even after subsidies (see below) have been provided for. *(Already provided for in the Electricity Act of 1999, with case-specific tariffs to be approved by ERA)*
- Bulk-supply tariffs based upon the cost of supply at the delivery point in the main grid system. *(Already provided for in the Electricity Act of 1999, with details to be developed by ERA)*
- Non-discriminatory wheeling tariff (and access) to facilitate power transactions between distribution concessionaires and third-party generators. *(Already provided for in the Electricity Act of 1999, with details to be developed by ERA)*

(iv) **Subsidy transfer**, i.e., a Rural Electrification Fund (REF) to take account of regional and other considerations, with due consideration to efficiency and sustainability under a regime of cost-based regionally-differentiated tariffs and multiple service providers in the future. In particular, the Government will design schemes and allocation procedures so that:

- Subsidies are well-targeted for the intended beneficiaries, taking account of the varying ability to pay. This would include geographic targeting, such as distinguishing between peri-urban, rural, and "premium rural" areas, where the last would enjoy the highest subsidy levels.
- Subsidies evoke an efficient supply response, which reduces the need for subsidies.
- Subsidies promote output, instead of being linked to inputs
- Subsidies should facilitate financing of private sector led projects. From a commercial lender's viewpoint, subsidies made available during project construction function as equity, thus reducing the need for debt financing, and increasing the lender's comfort with providing debt financing.
- Subsidy schemes should be based on good governance principles. *(The RE Fund is already provided for in the Electricity Act of 1999, and principles of its operation acceptable to the Bank are delineated in the Rural Electrification Strategy and Plan {see section C2}. Creation of the REF, RE Agency and RE Board are conditions of presentation of the project to the Bank's Board.)*

## **2c. Renewable energy resource potential is under-utilized.**

Apart from large-scale hydropower schemes, only a small fraction of Uganda's renewable energy resource potential - which includes (i) power generation from a variety of sources such as biomass residues, small hydro, wind, and geothermal and (ii) solar energy for stand-alone photovoltaic systems - has been tapped to date. While several small/mini-hydro and biomass projects have been proposed in the past several years, their development has been constrained by a number of factors including: i) a widely held belief that only UEB was permitted to sell power; ii) lack of access to long-term financing; iii) undeveloped local capacity for planning and implementing such projects. The prospects of utilizing solar energy have been given a boost by the ongoing UNDP-GEF Uganda Pilot Project for Photovoltaic Rural Electrification.

**Strategy.** The Government has formulated, in consultation with the Bank, a strategy to establish a regulatory and investment climate within Uganda that promotes private sector led, commercially-oriented development of these resources (see Annexes 12 and 13 for details). In addition, the Government will seek financial support from various multilateral, primarily GEF and Clean Development Mechanism (CDM) sources such as the Bank's Prototype Carbon Fund (PCF), and bilateral agencies that are interested in supporting renewable energy.

## 2d. ICT sector issues and strategy.

**Low rural access.** As a result of the recent telecommunications sector reform in Uganda, telephone coverage has grown dramatically with the number of lines (fixed plus cellular) more than doubling over the two year period from 1998-2000. By July 1999, Uganda became the first African country with more mobile than fixed telephone customers, with market penetration of mobile far exceeding original projections of demand by several orders of magnitude. Overall, national teledensity has reached 0.99 (fixed plus cellular) telephones per 100 population, which puts Uganda above the average teledensity of about 0.60 for Sub-Saharan Africa (excluding South Africa). However, the vast majority of these lines are concentrated in the Kampala area. Thus, as of mid-2001, fewer than half of Uganda's 920 sub-counties (average population of 20,000) have telephone service.



**Internet demand is strong in Kampala, and e-mail is available at the main post office, though ISP charges of US\$50 per month (unlimited access) with additional telephone usage charges are very high. The project will promote Internet access in the district capitals and rural areas (See Annex 2 for details) Source: ITU, Geneva.**

**Internet access.** The market for Internet access in Uganda is competitive but currently small with some 6,000 subscribers and six principal Internet Service Providers (ISP), the two largest of which are Infocom and Africa Online with 4,000 and 1,500 customers respectively. ISP services are currently limited to the

Kampala area due to the absence of Points of Presence elsewhere in the country, though AFSAT provides satellite based access to corporate clients throughout the country, while Bushnet provides HF Radio based email accounts for users in remote rural areas. Commercial cyber cafés have become commonplace in Kampala, but are virtually unheard of in rural areas. The cost of Internet access at these establishments has been coming down and is currently U.Sh.50 per minute (equivalent to US\$1.80 per hour).

**Sector reform.** Government initiatives to boost the economy through privatization and foreign investment are starting to pay off. Nowhere is the more evident than in the telecoms sector which is now one of the most liberal in Africa. The GOU has recently undertaken substantial and *successful structural reforms* in the telecommunications sector, with WB assistance under the recently completed 'Enterprise Development' Technical Assistance Loan (Number 23150). The 1997 Uganda Communications Act provided for the incorporation and privatization of Uganda Telecommunications Limited (UTL), and required the introduction of competition in basic telecommunications service provision, initially through a licensed duopoly with a 'dual' exclusivity period running through until July 2005. In 1998, a license was awarded to MTN Uganda to become the country's second national operator. The 1997 Act also led to the creation the Uganda Communications Commission (UCC) as the regulatory agency charged with licensing and monitoring the ICT sector.

*An integral element of the sector reform is the focus on improving access in rural areas.* Thus, the licenses of the two national operators incorporate significant 'rollout' obligations. UTL is committed to providing 100,000 new land lines by July 2005, of which 30,000 must be rural and 3,000 must be public telephones. MTN Uganda has a minimum target of nearly 88,000 lines over the same period, of which 2,000 must be public telephones. Furthermore, both operators are required to have a presence in every county in the exclusivity area.

However, in recognition that telephone services would not necessarily be commercially viable in all parts of the country, the two operators have been given one year since the start of the exclusivity period (that is from July 2000 to July 2001) to declare which of the country's 170 counties they do and do not wish to serve. In the counties they wish to serve, they will be required to provide at least one telephone line by July 2002; in the remaining counties, the two national operators will forfeit their exclusivity, and responsibility for licensing services will revert to the UCC. The 1997 Uganda Communications Act provided for the establishment of a Rural Communications Development Fund (RCDF) for financing access in areas not considered to be commercially viable by the private sector. In line with international best practice, the UCC plans to competitively tender the provision of ICT infrastructure in unserved areas to private sector operators using the minimum subsidy concession vehicle.

**Strategy.** The UCC has set itself the objective of extending access to voice telephony and Internet services into the rural areas.

**Access to voice telephony at sub-county level.** The policy objective has been defined as the provision of at least one public telephone per 5,000 inhabitants at the sub-county level, throughout Uganda. Given that the average population of a sub-county is around 20,000 people, this is equivalent to four telephones per sub-county. Moreover, given that sub-counties typically represent an area 10 km in radius, the achievement of this objective would put most of the population within 5 km of a telephone. This distance objective is similar to that adopted in other countries, such as Peru and Nepal. The two national operators (MTN and UTL) are contractually required to serve all commercially viable rural areas, but were contractually given until July 2001 to establish these geographical limits. Based on the operators declarations, it has been established that 156 of the countries 931 sub-counties are not commercially viable for telephony services and will become the responsibility of the RCDF.



**Internet access at District level.** For Internet, the policy objective is to ensure reliable access at local call rates in each of the country's 56 District Headquarters. This will be achieved by providing Internet Points of Presence at District Headquarters, together with a public Internet access facility.

**Multi-purpose community telecenters in deep rural areas.** To allow Internet use to spread beyond the District centers, support will also be provided for the use of Internet by a select number of 'vanguard institutions' in remote areas (such as schools and hospitals, as well as agricultural and business associations). The facilities will be located in institutions that have a clear potential to benefit from the service, and will incorporate activities to train members of the local community and facilitate the development of locally relevant applications.

In line with international best practice, the UCC plans to competitively tender the provision of ICT infrastructure in unserved areas to private sector operators. Since these areas are considered not to be commercially viable, contracts will be awarded to those operators requiring the minimum subsidy to undertake the specified investments. These 'one time' capital subsidies will be financed from the RCDF.

**Subsidizing rural access.** The Rural Communications Development Fund (RCDF) is intended to serve as a mechanism for financing the achievement of universal service objectives in areas not considered to be commercially viable by the private sector. In order to ensure that the bidding out of these investment projects to the private sector will be done in a competitive and transparent manner, the decisions relating to the rural program will be taken by the RCDF Board of Trustees that will operate at arm's length from UCC (which itself operates at arm's length from the Ministry of Communications). The main domestic source of revenue into the fund is the Universal Service Levy (USL), which is levied on the turnover of the telecommunications and postal sectors, although the fund may also receive contributions from multilateral and bilateral agencies. By law the USL can be up to 2.5% of gross operator revenues (excluding sale of equipment). In the year 2000 the Minister of Communications chose to set the USL at 1% of gross revenues. The fund will start to collect revenues from the year 2001/02, and is expected to accumulate between US\$1-2 million each year thereafter.

It is estimated that the subsidy cost of meeting the rural access objectives defined above - which depend on the extent of the area which the current incumbents are unwilling to serve and the share of the subsidy in the capital costs - would be around US\$6 million. Given the flow of USL revenues into the RCDF, the estimated subsidy required to meet the three priority objectives defined above could not be expected to accumulate in the RCDF before the year 2005. **On this basis, IDA seed-financing of US\$5 million would lead to a significant acceleration of rural access.**

### **3. Sector issues to be addressed by the project and strategic choices:**

The two **energy sector issues** to be directly addressed by the project are the *low rural electricity access* and the *under-utilization of the renewable energy resource potential*. In general, the key design features and details of this project are being coordinated with the activities and policies related to *power sector reforms and capacity additions*; in particular, there are three links that are being closely coordinated:

- design and details of the Rural Electrification Fund (REF).
- addition of any renewable energy based power generation capacity on the main grid.
- disposition of UEB-operated isolated rural systems that are not connected to the main grid.

The **ICT sector issue** to be addressed is the *low rural access to ICT* services despite successful

implementation of telecommunications sector reform and rapid improvements in teledensity at the national level. It is expected that the project will catalyze a substantive increase in rural access to both telephones and Internet.

### **Strategic choices.**

The *first strategic choice* made by this project is to stretch the project's boundaries beyond the energy sector to focus on rural transformation, i.e., a significant change in the productivity of rural enterprises as well as the quality of life of rural households; the alternative of an internally-focused rural electrification project does not offer good prospects of a significant development impact, at a time when it is clear that, in the past, even successful projects, particularly rural electrification projects, have often failed to make a noticeable difference in rural lives. In particular, the proposed project includes an ICT component as well as cross-sectoral links to selected end-user sectors: agriculture, health, education, water, and small and medium enterprises.

There are three reasons for including an ICT component in this project. First, there are clear synergistic links between energy and ICT: adequate and reliable power supply is an essential input for ICT services, while the ICT sector can form an "anchor" customer for power supply provision in rural areas. Second, the development impact of the introduction of both electricity and ICT services into a rural area is likely to be greater than the sum of the effects of the individual parts. Third, there are economies of scope - in terms of preparation and supervision costs - from including a relatively small ICT component in the project.

The underlying basis for the cross-sectoral links is that carefully calibrated, adequate and reliable supplies of modern inputs such as electricity and ICT services can significantly improve service delivery/productivity in the end-user sectors, while recognizing that the end-users sectors also face other constraints - often of a more critical nature - beyond the lack of adequate electricity and ICT services. Under this approach, agents in the end-user sectors are "clients" whose purchase - subsidized, as deemed appropriate - of electricity and ICT services facilitates their efforts to reach their own goals. As a result, there are no circular linkages between the various sectors that have the potential of spreading implementation difficulties from one sector to the other.

The program will support two ways in which the energy and ICT sectors can assist with the transformation of the **agricultural** sector: (i) **improve agro-processing potential** by electrifying areas where lack of adequate and reliable electricity is a critical constraint to *agricultural production, agro-processing and post-harvest storage*, as farmers switch from subsistence to commercial farming; (ii) **increase access to market information**. Timely price information could be quite important for farmers, as could be building business relationships with outsiders. Further, information dissemination, agriculture extension and agricultural education would also benefit from increased access to ICTs.

For the **health** sector, the primary link is to facilitate the goals of the Uganda National Minimum Health Care Package by providing energy for medical equipment and Parish, Subcounty, and County level Health Centers, including staff living quarters, with a focus on lighting, cold chain, sterilizing, and telecommunications.

For the **education** sector, the links would be mainly to post-primary education where the provision of energy and ICT services has the potential of a significant impact, i.e., in vocational training where equipment and machines requires energy; secondary schools where access to computers and electronic information would improve the quality of education, and lower the costs of communication and knowledge transfer; staff housing; and lighting for evening studies.

For the **water** sector, the links would be for the provision of energy for water pumping in support of the recently completed rural water strategy.

For **SMEs**, the links are in the form of technical assistance, under which enterprises with *motion-intensive* processes and production will be assisted to switch to electricity, and *heat-intensive enterprises such as fish smoking, lime production, and eating houses*, will be assisted in increasing the energy efficiency of their operations.

A **second strategic choice** is to promote rural electrification in a commercially-oriented manner, under which the investment, operational and consumption decisions at the margin - “the last dollar”- are made on an unsubsidized basis, while affordability and equity considerations are tackled by an appropriate subsidy transfer and financing mechanism (see section B2b, *points (iii) and (iv) of Government strategy*). This is the only option that offers good prospects in Uganda, and is also embedded in IFC’s under-preparation rural electrification project in Uganda, for which this project has provided background support and which would receive subsidies *via* the RE Fund. The alternative of State-led rural electrification with subsidies provided through a national uniform tariff has not worked well in most countries, and is a non-starter in Uganda, given UEB’s poor past and current performance. On the other hand, fully commercial rural electrification, i.e., with no subsidies, would not attract enough service providers, given the risks and high initial costs arising from the lack of any experience with such an endeavor, and hence, would be unable to accelerate rural electricity access significantly.

A **third strategic choice** is neutrality and flexibility with respect to regional location, business models, supply modalities and technology. In particular, the project will be national in scope, support multiple business models, including public-private joint ventures, and utilize a broad set of supply options, ranging from relatively large (for rural areas) stand-alone mini-grids to small solar photovoltaic systems; while the program will not directly support battery-charging stations to serve individual household who use automotive batteries to power some lights and/or radio/TV, it is expected that such enterprises will spring up around trading centers and other clusters that become electrified. While this does increase the complexity of project design and implementation, a narrower range of supply options would be unlikely to accelerate and scale-up rural electricity access, thus reducing the impact of the project. At the same time, the project’s approach will be to look for and define workable entry points and growth trajectories for each option in order to mitigate implementation difficulties.

A **fourth strategic choice** is to explicitly focus on the needs of rural enterprises and public institutions, and not just on rural households. In Uganda, rural trading centers include clusters of enterprises, many of which wish to improve their productivity, that have an ability to pay significant amounts for electricity, and can form the critical mass of demand required for setting up an independent grid, which could then serve nearby households and public institutions on relatively affordable terms. As indicated above, the program would work with health and education sector authorities to meet the priority energy and ICT needs of rural health and educational facilities in a cost-effective manner, so that the poorer segments of the rural population are able to receive some indirect benefits from this program.

In most cases, rural public institutions would be unable to pay the full cost of energy supplies; at the same time, the commercial orientation of this program requires that the service providers recover their costs, and do not provide energy or ICT services to any consumers at reduced prices with implicit cross-subsidies. This “affordability gap” would be covered by devising sustainable financing plans consisting of local contributions, government funds, and grant support from bilateral donors.

A ***fifth strategic*** choice is that though the project embraces the basic vision of Community Driven Development (CDD) – **prosperity through empowerment of local communities** – rural energy and ICT service delivery are more suitable for private sector led provision because key decisions about these services will be made, in the main, by individual SMEs and households and these services are better viewed as private, not public goods. Further, where electricity and ICT services are deemed high priority by communities as well as for essential community needs such as schools, health clinics, or water pumping, the proposed project will facilitate an efficient and reliable supply response from the private sector to meet such demands. Finally, communities and local governments will participate in decisions about the nature and scope of the service provided and local governments in "light-handed" regulation.

A ***sixth strategic choice*** adopted by this project is to work in partnership with other donors. This is not only consistent with the Comprehensive Development Framework (CDF) approach but also has particular relevance for Uganda, where bilateral and multilateral donors have been and are planning to provide significant support to the energy sector, including for rural electrification, and rural provision of ICT services. The alternative arrangement of the Bank and the donors functioning essentially independently of each other, even with some amount of coordination, offers little beyond a slowly evolving *status quo* with limited development impact.

A ***seventh strategic choice*** is to promote rural energy and renewable energy in tandem. While it is possible, in principle, to separate the two, in Uganda there are significant linkages between renewable energy and rural transformation. To start with, the promotion of solar photovoltaic systems for rural areas is now a well-established practice in projects sponsored by the Bank as well as other agencies, and in Uganda, the ongoing UNDP-GEF project has already made a start in this direction. Further, many rural areas of Uganda have mini-hydro, coffee hulls, wind and other renewable resources that could be used to generate the power for independent mini-grid systems, such as those in the West Nile region and Kisiizi (see Annex 2 for details).

***Risk implication of strategic choices.*** A risk implication of these strategic choices is that although the proposed project is based on simple concepts, its implementation appears complex, given Uganda's limited absorptive capacity, and the project may face above-average implementation problems and delays. This issue is discussed later in section F *Sustainability and Risks*.

#### **4. Program description and performance triggers for subsequent loans:**

For both the energy and ICT sectors, the program will consist of two broad components: *capacity building/technical assistance* and *investment*.

The **energy sector capacity building/technical assistance** has a two-pronged approach:

- **initiation of a partnership-based, self-sustaining, long-term capacity building process outside the project (i.e., without support from IDA/GEF funds).** The project team, acting in a convener/facilitator mode, has initiated the formulation of partnerships - which are expected to foster cooperation and capacity building - between Ugandan institutions, such as Makerere University, and energy-related international professional organizations (such as *IEEE*, *CIGRE*), universities, NGOs, and private sector firms. The project team is also in contact with relevant institutions in other African countries, such as Mozambique, Tanzania and Zimbabwe, so that the activities in Uganda take account of the activities and existing capacities in other countries. It is expected these activities will lead to the formulation of technical, financial and social capacity and expertise in a number of Ugandan and other African institutions for energy-sector related rural



transformation, including Phases 2 and 3 of this project. The detailed work and financing plans will be developed by the participants, with some assistance from the project team. While no funds for these activities will be provided under this project, some funds will be sought from institutions such as the Bank-UNDP Energy Sector Management Assistance Program (ESMAP) as well as from bilateral donors.

- **within project** creation and/or strengthening of relevant rural and renewable energy organizations and institutions. The capacity areas covered would be policy setting, promotion, financing/subsidizing, regulation, service provision, and monitoring/evaluation of commercially-oriented rural electrification and renewable energy development; the agencies covered would include central and local authorities, private sector enterprises, including rural SMEs, and NGOs/CBOs.

For **rural electrification**, the main features of the within project capacity building plan are:

- outside the normal functions of the Ministry of Energy and Minerals Development, the creation and support of a RE Board reporting to the Minister of Energy and Mineral Development, a RE Agency under the Board, and a RE Trust Agent to disburse subsidies from the Rural Electrification Fund (see section C2 for details). The RE Board is already provided for in the Electricity Act of 1999; since the Board consists of part-time members, the RE Agency and the RE Trust Agent are needed to operationalize the Board's functions.
- within the normal functions of the Ministry of Energy and Minerals Development, the strengthening of the capacity for policy formulation;
- creating capacity within the national electricity regulator and local governments for "light-handed" regulation of independent grids;
- creating capacity within the cross-sectorally linked Ministries (Health, Agriculture, Education and Water) to participate in this project and take responsibility for the implementation of their respective sub-components; and
- strengthening, on a business-to-business basis using existing channels such as the Private Sector Foundation, the capacity of the: (i) private sector to undertake rural electrification sub-projects including reductions in the cost of service provision and improving the quality of service offered, and (ii) financial institutions to evaluate proposals for financing;
- strengthening the capacity of NGOs to assist rural SMEs to switch quickly from manual to electric power when electricity is introduced in the region or to increase the efficiency of traditional fuel use.

For **renewable energy**, the focus is on capacity building as called for in the GEF/World Bank Strategic Partnership for Renewable Energy: the thrust is to develop local capabilities for formulating strategies and plans for renewable energy development, as well as for identifying and developing specific renewable energy projects. The main features are:

- development and implementation of a long-term plan for capacity to identify and develop renewable energy projects;

- development and dissemination of renewable energy resource information to facilitate private sector investment decisions; and
- strengthening, on a business-to-business basis using existing channels such as the Private Sector Foundation, the capacity of the: (i) private sector to undertake renewable energy projects, and (ii) financial institutions to evaluate proposals for financing;

The project will support investments and technical assistance in both the energy and ICT sectors. In the **energy sector** the project would support the Government goal stated in the RE Strategy and Plan (Annex 12) of reaching 10% rural electricity access - approximately 400,000 + new connections via a combination of investments in the first three components identified below:

**1. Main grid related power distribution and generation.** The *power distribution* would be to presently unserved rural areas that would be connected to the main grid, with the power supply to come from the large-scale hydropower plants. The private sector distribution concession areas, arising from sector reforms, are narrowly defined in terms of the physical distance from the existing grid. Thus, the extension of the main grid to rural areas and the consumers would be supported under this sub-component. In keeping with the objective of renewable energy development, there would be additional power generation *from small, renewable energy resources*, such as sugar mills, that are close, or already connected, to the main grid. In the long run, the sale of this power would be to third-party customers *via* wheeling through the main grid, i.e., in the long run, there would be no power purchase agreement between the generator and the main grid, which would merely serve, for a fee, as the “highway” over which power is transported from the generator to a third-party customer. However, initially, there would be a power purchase agreement between the main grid and the renewable energy power generators, which would take account of the likely short-term power surplus when the Bujugali project comes online (see Annex 2 for details).

**2. Independent grid systems** for relatively concentrated isolated areas with a potential for the use of electricity by rural enterprises. This sub-component would support relatively larger systems that may require some transmission (such as in the West Nile region) and smaller systems, such as those located in rural trading centers that require only generation and distribution facilities. It is expected that a significant part of the power generation would be from renewable energy resources (approx. 35 MW over 10 years.)

**3. Individual/institutional solar PV systems**, for relatively dispersed areas and very small loads where even small independent grid systems are not viable.

**4. Cross-sectoral linkages with health, agriculture, education and water.** This would include both technical assistance as well as partial financial support for energy packages at rural facilities. Only a small part of energy investment are expected to be financed under this project, with most of the funds coming either from bilateral grants to the respective sectors or local counterpart funds. In particular, the project will support: in **health**, technical assistance and investment support to provide energy packages for rural health centers; in **agriculture**, technical assistance to the Ministry for program promotion as well as monitoring of program impacts; in **education**, technical assistance to the Ministry to develop an energy policy and guidelines for education; and investments support for energy packages in post primary facilities; and in **water** technical assistance to the Ministry to identify and meet energy needs of the recently completed rural water strategy.

**5. Energy Sector capacity building, technical assistance, and training**, This would include support to both public and private sector to implement their respective roles, including establishment and training of

the RE Board, RE Agency, and RE Fund, building of local project development capacity, low cost rural electrification designs, pilot programs in traditional fuels and biomass gasification, renewable energy development, and light-handed regulation to be undertaken at the local level. The **Ministry of Local Government** also will receive support to undertake the key information dissemination role in collaboration with the RE Agency, Private Sector Foundation, and other stakeholders as appropriate.

The **ICT sector** will also include both *technical assistance* and *investment*.

The **technical assistance** will help the UCC in the *preparation of competitive tenders to increase access in rural* area, by (i) designing the overall technical specification and packaging of the tenders for the provision of communications services and Internet POP, including identifying the geographical areas to be served by each contract, specifying the nature of the rollout obligations in each geographical area, establishing the interconnection rates and user tariffs, determining the quality of service parameters to be met, and estimating the likely subsidy requirements based on cost and revenue estimates, and (ii) drafting the bidding documents, including the contract to govern the delivery of services as well as the rules governing the bidding process (such as eligibility criteria, evaluation procedures, restrictions on bidding for multiple contracts), as well as assisting in the evaluation of the bids, the auditing of the investments, and the monitoring of subsequent quality of service.

The **investment** component will provide funds to the UCC to finance, on a competitive tendering basis, the subsidy associated with the rural access targets, in commercially unattractive areas, of the provision of: (i) at least one public telephone per 5,000 inhabitants at the sub-county level; and (ii) the provision of an Internet POP together with a public Internet access facility at each District Headquarters; and (iii) the provision of one rural telecenter at a 'vanguard institution' in each District located outside of the District Headquarters, that have the potential to benefit substantially from Internet access either because of their dynamism as agricultural trading centers or because of the presence of key institutions for the delivery of public health and education services.

### **Triggers for Phases II and III**

The overall approach is that the triggers for Phase II would be linked to the accomplishment of the objectives of Phase I, and for Phase III to the objectives of Phase II (see sections A1 and A3). For GEF, the triggers for Phases II and III, and the quantitative and qualitative indicators will be clarified in terms of the calculated baseline and related milestones for each of the different phases at the time of submission for approval to the GEF CEO.

The energy triggers for Phase II are: (*GEF related triggers are presented in italics*):

- Establishment of regulatory system for rural electrification, satisfactory working of RE Board, RE Agency and RE Fund;
- Workable financial intermediation mechanism for rural electrification;
- Satisfactory functioning of two independent grid rural electrification operations;
- Satisfactory functioning of 80 percent of the energy systems provided to agriculture-linked users, clinics, schools, and water facilities;
- The Bank and Government will agree at project mid-term on a suitable Phase II trigger related to the legal basis of the RE Board/Agency/Fund structure (see section C4).
- *15 MW of renewable energy power generation facilities constructed or under-construction;*
- *320,000 cumulative Watt-peak sales of solar pv systems to households and institutions; solar home system price reduction of 30% from June 2000 baseline (i.e. end-Phase I price of about*

*\$14/Wp compared to about \$20/Wp in June 2000)*

- *Finalization and implementation of first phase of long-term renewable energy capacity building strategy and action plan, including financing of recurrent costs of renewable energy projects and institutional arrangements;*

For the ICT component, the triggers for Phase II are as follows.

- Satisfactory achievement of Phase I coverage objectives for rural telephony, Internet Points of Presence and rural telecenters.
- Collection of at least 80% of the Universal Service Levy revenues that are billable by the end of Phase I.

The Phase III triggers, with the details to be developed during project preparation, would represent basically the same factors as the Phase II triggers, but at a higher level of development (*GEF related triggers are presented in italics*):

- Satisfactory progress toward the long-term connection targets
- Fully operational regulatory system, RE Fund, wheeling system and procedures;
- *Successful implementation and/or functioning of main grid rural extensification and independent grid systems, and sales of solar pv systems;*
- *Establishment of regional best practice level capacity to promote and undertake renewable energy development;*
- *Construction of additional renewable energy power generation facilities in the range of 20-25 MW, with a GEF share in total cost of about 15-20%, and the rest of the financing to come from a combination of Bank and commercial financing, with about 10 MW not supported by GEF;*
- *Sales of solar pv systems: about 50,000-75,000 household systems and 200-300 institutional systems, with a GEF share in total cost of about 15-20%, and the rest of the financing to come from a combination of Bank and commercial financing.*

## C. Program and Project Description Summary

**1. Project components** (see Annex 2 for a detailed description and Annex 3 for a detailed cost breakdown):

### Project Components (Phase 1)

Component	Sector	Indicative Costs (US\$M)	% of Total	Bank financing (US\$M)	% of Bank financing	GEF financing (US\$M)	% of GEF financing
1- Main Grid related power Distribution & Generation		45.55	37.0	20.80	42.3	4.60	38.0
2 - Independent Grid Systems		26.13	21.2	6.50	13.2	1.00	8.3
3 - Solar PV Systems		10.80	8.8	0.00	0.0	1.40	11.6
4 - Cross Sectoral		13.44	10.9	7.60	15.5	0.00	0.0
5 - Capacity Building, Technical Assistance, Training, M&E		14.78	12.0	8.75	17.8	5.12	42.2
6 - ICT		12.50	10.1	5.50	11.2	0.00	0.0
<b>Total Project Costs</b>		123.20	100.0	49.15	100.0	12.12	100.0
		0.00	0.0	0.00	0.0	0.00	0.0
<b>Total Financing Required</b>		123.20	100.0	49.15	100.0	12.12	100.0

## Project components (Phases 2 and 3)

Component	Sector	Indicative Costs (US\$M)	% of Total	Bank-financing (US\$M)	% of Bank-financing	GEF-financing (US\$M)	% of GEF-financing
1 - Rural Electrification Investments		203	64	74.56	64	11.25	63
2 - Cross Sectoral		39.47	12	17.82	15	2.11	12
3 - Capacity Building, Technical Assistance, Training		46.46	15	19.26	17	4.53	25
4 - ICT		27.06	9	4.36	4	-	0
<b>Phase 2 and 3 Total</b>		<b>316</b>	<b>100</b>	<b>116</b>	<b>100</b>	<b>17.89</b>	<b>100</b>

## 2. Key policy and institutional reforms supported by the project:

**Energy sector.** The key policy and institutional changes sought relate to power sector reforms, keeping in mind that this project is not the vehicle for the reform-related policy dialog or financing ***A conditionality for this project, as for other Bank group power sector projects is that the power sector reform process move forward in line with the plan previously agreed with IDA.***

Most of the key policy and institutional reforms related to this project have already been incorporated into the Electricity Act of 1999. At this stage, the bulk of the remaining job is to finalize the details of regulations and other secondary legislation that are needed to be able to implement the new provisions of the Act. Specifically, the following reforms related to the objectives of this project will be sought:

- ***Establishment of a Rural Electrification Fund and operating procedures with adequate autonomy and transparency.*** While the provisions in the 1999 Electricity Act do provide some degree of autonomy for the Rural Electrification Fund, it is essential to ensure the Fund has an adequate level of autonomy and transparency, as without it the Fund may face hard-to-resist political pressures, which may ultimately lead to wasted resources and lack of support from interested donors. The following steps, which can be implemented by appropriate secondary legislation, without any changes in the primary legislation, would be adequate:
  - Establishment of a part-time Rural Electrification Board, appointed by the Minister of Energy and Minerals Development, with Cabinet approval, and reporting to this Minister. The members of the Board would consist of the Permanent Secretaries of (i) Energy (Chair), (ii) Finance, (iii) Local Government, and representatives of the (iv) private sector involved in rural electrification, (v) civil society, (vi) the financial sector, and (vii) the donor community. The Board would be responsible for authorizing the payment of grants (smart subsidies) from the Rural Electrification Fund (REF) that are approved by the RE Agency (described below) and for approving the annual operational budget of the RE Agency and the REF;



- Establishment of a small, full-time specialized unit on commercial salaries called the Rural Electrification Agency ("RE Agency"), to be overseen by the RE Board, with responsibilities for the following functions: (i) program promotion and planning (long-term as well as year-to-year target-setting) and reporting implementation progress on national rural electrification and renewable energy development program, (ii) processing of all applications - solicited and unsolicited - from project sponsors to the REF, and (iii) coordination of implementation of cross-sectoral links with the concerned line ministries.
- Establishment of a Rural Electrification Trust Agent, who would be contracted by the Board, to disburse subsidies - administer payment of funds from REF - upon authorization by the RE Board and to monitor timely and satisfactory implementation progress of the beneficiary sub-project completion.

**A condition for Board presentation is that the Energy Minister use a statutory instrument to create the RE Fund, Board and Agency with a governance structure and operating guidelines acceptable to the Bank.** Agreement would be sought at negotiations on a covenant in the DCA to the effect that any changes to the RE Fund, Board and Agency arrangements and in the operating rules, must be notified in writing and a found acceptable to the Bank prior to implementation thereof. It is expected that the bilateral contributions to the RE Fund would be subject to similar conditions in the respective bilateral agreements. Agreement would also be sought at negotiations to the effect that a condition (trigger) for processing APL2 would be the implementation of a strengthened legal basis to safeguard the autonomy and continued stability in the arrangements and rules governing the RE Fund, Board and Agency structure.

- *Detailing of the following provisions already provided for in the 1999 Electricity Act (to be done by the Electricity Regulatory Authority in coordination with overall power sector reforms).*
- "Light-handed regulation" procedures and processes to ensure that the cost of regulatory compliance is not unduly burdensome to small, stand-alone grid-based power systems. (Good progress in this effort has been made by the Authority with assistance from NORAD-funded consultants in consultation with the Task Team.)
- Regionally differentiated retail tariffs, for all suppliers, including UEB and its successors, which vary according to the cost of service delivery, except within the original license area of the existing main grid, for which there would initially be a uniform tariff. (Acceptable changes in this regard are incorporated in the Rural Electrification Strategy and Plan.)

**ICT sector.** The legal basis for the RCDF already exists in the 1997 Uganda Communications Act, and the UCC has already made significant progress towards determining the objectives of the fund as well as a plan for its organization. **The only policy change sought is that the administrative arrangements for the RCDF be implemented to the satisfaction of the Bank.**

### **3. Benefits and target population:**

The benefits of the project are:

- For *rural households*, there will be direct and indirect benefits of increased access to (i) adequate and reliable supplies of electricity, from grid supply or solar photovoltaic systems, and (ii) ICT services, both of which will improve the quality of lives. The indirect benefits would arise from the

improved service provided by rural public institutions - health, education and water - arising from their increased access to electricity and ICT services; where Internet services are provided, education and health services will also improve as a result of distance learning capabilities.

- For *rural enterprises*, the benefits of increased productivity and income arising from electricity access -- with technical assistance provided to accelerate switch over to electricity – and/or more efficient use of traditional fuels, whose use is likely to continue in *heat-intensive* applications such as lime kilns. The improved access to telephones and Internet is expected to: (i) increase the ability of rural enterprises to select between and coordinate with upstream suppliers thereby reducing the costs of doing business, and (ii) improve the linkages with downstream markets, helping entrepreneurs to identify suitable markets and to obtain the best prices for their produce.
- Reductions in greenhouse gases, which has global environmental benefits.

Since this is a national program, the target population would be distributed over various parts of Uganda, While a conscious effort will be made to promote regional equity, it is likely that all sub-components of the program will not be equally appropriate for the different regions.

**Monitoring and Evaluation (M&E)** of the program impacts will be undertaken to establish the effectiveness of the program in meeting its rural transformation objectives and also to identify constraints to address in Phases II and III (see Annex 2 for additional details). The M&E program will:

- document the state of service as well as the social and economic welfare in a sample of communities before ERT implementation;
- track service provision and demand and economic and social welfare during the project lifetime to identify changes attributable to the ERT program;
- distinguish between the impacts on connected and unconnected sections of the community;
- where possible, make comparisons with non-ERT communities so as to distinguish ERT project impacts from other economy and society-wide changes;
- facilitate drawing of lessons applicable to later ERT program phases and other Ugandan and Bank programs.

#### **4. Institutional and implementation arrangements:**

Power sector reform, as provided in the Electricity Act of 1999 means that the Government, through UEB, will no longer be the implementing agent for Rural Electrification. Instead, the private sector is now to be the primary provider, with Government adopting an enabling role. This project will support the new entities called for in the Act - the Electricity Regulatory Authority, whose primary functions are licensing, tariff setting, and creation and enforcement of performance and safety standards, and the Rural Electrification Fund which will provide investment subsidies for investments. In addition, the project will support other key actors develop their roles to ensure that the new structure functions efficiently:

- **MEMD**, which will fix overall sector goals, policies, and strategies, including for renewable energy. The Minister, MEMD also will establish the RE Board/Agency/Fund structure;
- a **Rural Electrification Board**, which will oversee operation of the RE Fund to disburse rural electrification grants (subsidy) to qualified sub-projects;
- a **Rural Electrification Agency**, which, on a day-to-day basis, will be the Government's primary catalyzing agent, providing oversight, technical assistance, coordination, at the direction of the Rural Electrification Board;

- **Project sponsors**, who will be responsible for preparing and implementing RE and ICT subprojects;
- a **Business-to-Business Advisory Facility**, to assist project sponsors in preparing subprojects;
- **Financial institutions**, which will provide term loan financing to project sponsors on commercial terms.
- **Bank of Uganda** will administer the IDA refinancing of the initial investments;
- **Ministry of Local Government**, will act as a convener and facilitator for dissemination of the information and promotional activities undertaken by the MEMD
- **End users**, including small and medium enterprises, who need to understand and accept the new sector structure and who stand to benefit from the increased access and efficiency it brings;
- **Ministries of Health, Education and Water**, whose service provision would benefit from access to electricity;
- **Uganda Communications Commission**, which will implement the ICT component.

Technical assistance to be provided to these institutions through the project is summarized in Table C 4.1. (See Annex 2 for additional details.)

**Table C 4.1**  
**Allocation of Credit and Grants for Technical Assistance,**  
**Capacity Building and Training for Phase 1**

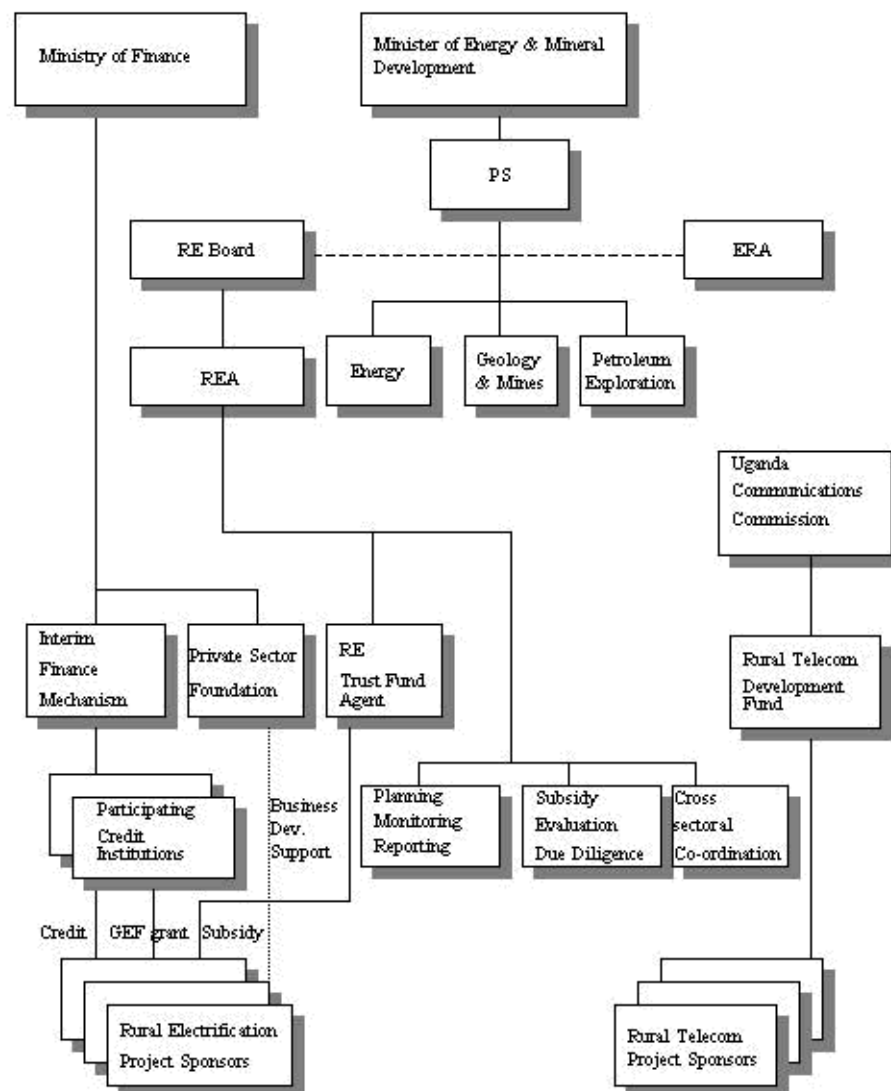
	Total	IDA		GEF	
Implementing Agent	US\$ m	Activity	US\$ m	Activity	US\$ m
<b>Rural Electrification Board</b>	<b>4.21</b>		<b>4.21</b>		
	.73	RE Agency staffing and operational support	.73		
	.18	RE Fund management, including disbursement <i>Private firm or bank</i>	.18		
	1.0	RE Advisory Services including overall support and capacity building to Director and Staff in establishing RE Agency. Services to include full range of Agency activities and will also include management, procurement, environment and social safeguards <i>Internationally recognized consultant (long-term)</i>	1.0		
	.4	Preparation in conjunction with the MEMD of indicative RE Master Plan, including both grid and off-grid in coordination with System Operator and MEMD. Includes local capacity building as well as provision of hardware and software for updating and for public access <i>Consultant</i>	.4		
	1.2	Planning, promotion and regional outreach; subsidy evaluation and due diligence; cross-sectoral coordination and support, dissemination of low cost options and equipment specifications <i>Consultants (short-term)</i>	1.2		
	.2	Community outreach and feedback to ensure RE Board is well apprised of ideas, issues, and concerns at local level <i>NGOs</i>	.2		
	.5	Develop in-country capacity and progressively mainstream lower cost network designs, equipment, construction and O&M policies, and local supply response to support an expanding market for privatization and grid and off-grid rural electrification (including private sector and technical institutions) <i>Internationally recognized utility/agency as consultant with local consultants</i>	.5		

<b>Ministry of Energy &amp; Mineral Development</b>	<b>4.35</b>		<b>1.25</b>		<b>3.1</b>
	.35	Program promotion operational expenses	.35		
	.5			Renewable energy capacity building assessment and renewable energy resource information system <i>Consultant</i>	.5
	2.1			Development, implementation, monitoring and evaluation of first phase of overall renewable energy strategy and plan <i>Consultant</i>	2.1
	.4	Indicative RE Master Plan prepared in conjunction with the REA	0.40		
	.5			Biomass gasification <i>pilot activities</i>	.5
	.5	Finalization of technical content on efficient and clean biomass usage for provision to SMEs and households; <i>pilot activities</i>	0.50		
<b>Ministry of Finance</b>	<b>4.050</b>		<b>2.835</b>		<b>1.215</b>
	1.0	Monitoring and evaluation of program impacts <i>consultants engaged by Poverty Monitoring Unit</i>	1.0		
	2.36	"BUDS-Style" Business-to-business development support and services, including up to date market information about products and markets, and facilitation with financial intermediaries and communities <i>local consultants through Private Sector Foundation (PSF)</i>	1.355	"BUDS-Style" business-to-business development support under auspices of PSF including market and rural network development support, business planning, financial planning, product and technical information support, building links between product suppliers and regional/international markets, due diligence on business and market planning, certification of government dealer conduct code, end-user audits post installation. <i>local consultants through PSF</i>	1.025
	.10	Institutional Capacity Building including RE project appraisal support to financial intermediaries, professional development of local staff, etc. <i>local institutions through PSF</i>	.1		
	.05	Sensitization of local communities regarding RE services to be provided <i>NGOs through PSF</i>	.05		
	.42	Rural Business Services to SMEs (Productive usage of electricity and traditional fuels) <i>local consultants through PSF</i>	.23	Rural Business Services to SMEs (Productive usage of renewable energy) <i>local consultants through PSF</i>	.19
	.10	Development and start-up of Credit Support Facility. <i>consultants through PSF</i>	.1		
<b>Ministry of Local Government</b>	<b>.35</b>	Local Government to convene and facilitate rural electrification information/promotion and	<b>.35</b>		

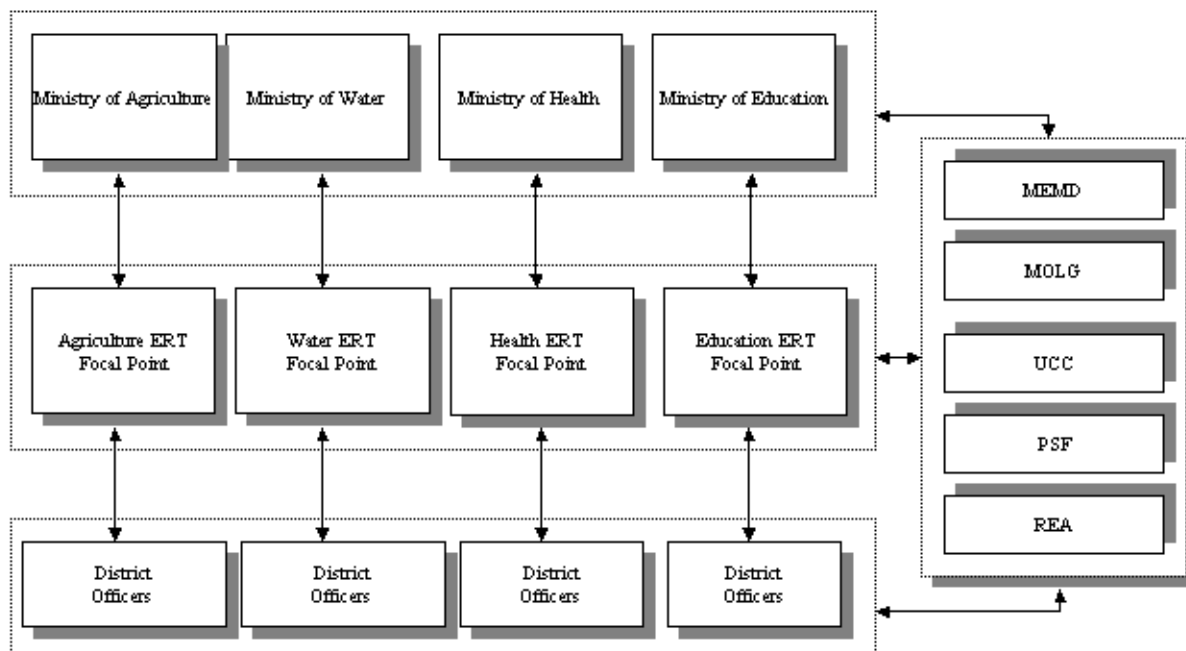
		identify/mitigate concerns of local government <i>Consultants &amp; operational expenses</i>			
<b>Ministry of Health</b>	<b>.6</b>	Promotion, implementation, and monitoring of Health Energy program <i>consultant</i>	<b>.3</b>	Promotion, implementation, and monitoring of Health Energy program (renewable energy aspects) <i>consultant</i>	<b>.3</b>
<b>Ministry of Agriculture</b>	<b>.6</b>	Promotion, implementation, and monitoring of Agriculture Energy program <i>consultant</i>	<b>.3</b>	Promotion, implementation, and monitoring of Agriculture Energy program (renewable energy aspects) <i>consultant</i>	<b>.3</b>
<b>Ministry of Education</b>	<b>.6</b>	Education/energy strategy development, training, promotion, monitoring, <i>consultant</i>	<b>.5</b>	Education/energy strategy development, training, promotion, monitoring, (renewable energy aspects) <i>consultant</i>	<b>.1</b>
<b>Ministry of Water, Land, and Environment</b>	<b>.6</b>	Water/energy strategy development, training, promotion, monitoring, <i>consultant</i>	<b>.5</b>	Water/energy strategy development, training, promotion, monitoring, (renewable energy aspects) <i>consultant</i>	<b>.1</b>
<b>Uganda Communications Commission</b>	<b>.5</b>	Design of technical specifications and service delivery contract details, preparation of bidding packages and documents, bid evaluation assistance, investment auditing, monitoring quality of service <i>Consultant</i>	<b>.5</b>		
<b>TOTAL</b>	<b>15.860</b>		<b>10.745</b>		<b>5.115</b>

The roles of the key actors in the restructured sector are set out below and shown in Figure C4.1 on next page.





**Figure C 4.1 ERT Project Functional Responsibilities - Finance, Energy, and Telecomm**



**Figure C 4.2 ERT Project Functional Responsibilities - MOLG and Line Ministries**

**Ministry of Minerals and Energy Development** MEMD will play a key role in establishing the RE Board/Agency/Fund structure. In keeping with the power sector reforms which feature a shift in the Government's role from market maker to market enabler, this will allow the MEMD to adopt a role focusing on strategy, policy, and plan development, and overall monitoring of the sector, with other key actors taking the more active implementation roles for rural electrification as described below. The ERT project will include consultant support to MEMD in adopting these important, high-level activities. Among these will be development of a strategy and plan for national level renewable energy capacity building and mainstreaming into the energy sector.

**A Rural Electrification Board (RE Board)** will be created by the Government with the following primary responsibilities:

- Discuss and approve the annual rural electrification report prepared by the Rural Electrification Agency (described below) for submission to the Minister of Energy;
- Define the policies for subsidy levels, project eligibility criteria and application processing and other procedures based on proposals made by the RE-Agency. The rules on this are included as

- part of the annual rural electrification report, which is submitted to the Cabinet; and
- Oversee the management of the Rural Electrification Fund

The RE Board will be composed of Permanent Secretaries of the Ministries of Energy and Mineral Development (Chair), Finance, Planning and Economic Development, Local Government, a representative of the donors, a representative of the private sector involved in rural electrification, a representative of civil society, and a representative of the financial sector.

A **Rural Electrification Agency (RE Agency)** will be established by the Minister of Energy and Mineral Development to carry out the Minister's responsibilities with regard to Rural Electrification. The RE Agency will report to the RE Board. The cost of operation will be funded by the Rural Electrification Fund. The RE Agency will be responsible for analysis of RE policy issues, planning in collaboration with the System Operator, monitoring and evaluation of Rural Electrification nationally, and information dissemination. The RE Agency also will act as a secretariat for the Rural Electrification Board. In this capacity it will review subsidy applications from rural electrification project sponsors and provide recommendations to the RE Board for action. The RE Agency will have a small staff, who will be hired on private sector salary scales. For this reason, the RE Agency will be outside of MEMD. Consultant support for the RE Agency is included within this project.

The Agency's monitoring and evaluation efforts will be particularly important in assessing the program's progress toward its rural transformation objectives. The system is linked to the two elements – rural transformation and environmental protection – of the overall program purpose, as well the objectives, outputs and triggers for each of the phases, and includes participatory as well as quantitative techniques.

The creation of the Agency by the Minister through a statutory instrument is a condition of Board presentation. A study will be prepared in preparation for the project mid-term review - to be financed by the Bank - to assess the workings of this structure, and suggest required legal changes, including the need to provide a strengthened legal basis to safeguard the Agency's autonomy. The Bank and Government would then agree on a suitable trigger for APL2 related to the legal basis of the Agency and Board.

A **Rural Electrification Fund (RE Fund)** will be established by the Minister of Energy and Mineral Development as the primary channel for rural electrification subsidies. The RE Fund will be overseen by the RE Board, with day-to-day operation by the RE Agency. Processing of funding applications from subproject sponsors will be undertaken by the RE Agency, which will forward recommendations to the RE Board. Once the funding has been approved by the RE Board, the Trust Agent for the RE Fund will administer the payments of funds to the applicant. The process will be subjected to close auditing of the flow of funds, of compliance with the criteria for the awarding of grants that are fixed by the RE Board, and of efficiency in the processing of applications and requests for funding. The results of the audits would be presented to the RE Board and be summarized in the annual report by the MEMD to the Cabinet on the status of rural electrification.

According to the Electricity Act, 1999, the moneys of the Fund shall consist of:

- Money appropriated by Parliament;
- Any surplus made from the operations of the Electricity Regulatory Authority;
- A levy on transmission bulk purchases of electricity generation stations; and
- Donations, gifts, grants and loans acceptable to the Minister of Energy and Mineral Development and the Minister of Finance, Planning and Economic Development.

During the first years, the funds provided by the transmission levy will be low, of the order of US\$ 2-3 million, but will grow rapidly as sales in the interconnected grid increase in response to grid improvements and expansion in generating capacity. Therefore, the REF will initially be largely dependent upon contributions from donors. It is anticipated that the initial capitalization of the fund through the ERT project will not only provide for initial operation, but also will encourage bilateral donors to participate. Discussions with several key bilateral donors including the Netherlands, Norway, Denmark, and Sweden indicate an interest in supporting a properly designed and operated RE Fund.

Subsidy allocation for the RE Fund will be established by the RE Board through open and public discussion based on the guiding objective of maximizing access per invested subsidy amount subject to the satisfaction of regional equity requirements. Criteria for subsidy levels will include the institutional, financial and commercial viability of the project. Project selection criteria will, in addition include the satisfaction of economic development, social and regional development goals for rural electrification. The criteria for fund allocation will be fixed in the annual report to the Cabinet on rural electrification. The grant support will include a focus on providing electricity to local administration centers, health facilities and community/social centers.

The appraisal and financing of the sub-projects will be the responsibility of **commercial financial intermediaries** such as banks, and possibly other financing agents, to enable access by sub-project developers for long-term financing - at market terms and commercial discipline - as well as working capital for dealers. In turn, the commercial intermediaries will be able to avail of the credit enhancement, first loss guarantee or other facilities provided in support of rural electrification investments. Initial investments, prepared during ERT preparation and also prior to operationalization of the Credit Support Facility (see Section E5), would be eligible for refinancing channeled through the **Bank of Uganda**.

Some projects involving renewable energy investments will be eligible for GEF grants, which will not be commingled with the grants from the RE Fund - though it is expected that some projects will receive grants from both sources - to ensure that each of type of grant serves its own objectives and meets the requirements of the source of funds.

**Electricity Regulatory Authority** In conformance with the Electricity Act of 1999, the Authority has now been established and is beginning to develop the regulations by which it will discharge its responsibilities under the law. The primary duties of the Authority are licensing, tariff setting, and development and enforcement of performance & safety standards. For any small systems with generation of less than 2 MW or sales of less than 4 GWh, the Electricity Act contains provisions which allow ERA to delegate its regulatory powers to competent local authorities. The Government recognizes that most local authorities will not have the required level of competence to act as regulators. In the longer term, the capacity building is expected to enable local authorities to perform an appropriate role.

A **Business-to-Business Advisory Facility** will be established and operated by the Private Sector Foundation, to channel assistance to subproject sponsors. The facility would agree with a potential subproject sponsor on the type of consultant assistance needed to prepare a bankable business plan. This could include technical design, market assessment, management or administrative advice, financial expertise, social intermediation, load promotion, etc. The facility would then provide cost-shared support of consultants selected by the sponsor provided the consultants were appropriately qualified.

The **Ministry of Local Government** will provide an important link with local governments, acting as a convener and facilitator of informational and promotional activities undertaken by MEMD.

**Project sponsors**, primarily private sector firms and NGOs, who may form partnerships with local government authorities and/or the community concerned, will receive support from the business-to-business advisory facility described above. Financial support to project sponsors will come through two paths: the RE Fund which will provide investment subsidies based on well-defined criteria and procedures, and debt/equity financing from financial institutions.

Awareness raising among **end users** will be undertaken by the RE Agency to increase general acceptance of the overall program. Businesses in areas slated for electrification will receive support in assessing the benefits of “electrifying” their operation. The program also will offer capacity building assistance to micro-finance organizations interested in offering credit for small and medium enterprise electrification as well as to households to cover the initial connection fee.

**Line ministries** (Agriculture, Health, Education, and Water) will receive capacity building and technical assistance support channeled through the RE Agency to optimize the delivery of energy services to their rural operations.

**Rural telecommunications** will be specifically targeted for support in view of the high value synergy between telecomm and energy. This support will be channeled through the Uganda Communications Commission's rural communications program the RCDF. The fund would operate in a manner similar to the RE Fund, and provide limited one-time subsidies, to be awarded through a competitive process, with the objective of accelerating the roll-out of telephone and Internet services in rural areas of Uganda which are proven not to be commercially viable for ICT services, but where these services nonetheless promise to yield significant social benefits.

## **D. Project Rationale**

### **1. Project alternatives considered and reasons for rejection:**

Most of the key issues related to project alternatives considered and rejected have already been discussed under the section related to *strategic choices* (see section B3). Hence, the only issue considered here is the choice of an APL as the lending instrument. The alternatives considered were (i) a conventional project (SIL), and (ii) a LIL, followed by a SIL.

Both rural electrification and the development of renewable energy in Uganda would benefit from a long-term approach that retains flexibility for changes as conditions evolve over time. Given the current low levels of rural energy access, negligible utilization of renewable energy, and the lack of experience with commercially-oriented approaches, the approach adopted under this project is to start small and accelerate scale-up over time. A conventional project, with a short-term horizon, is not well-suited for this purpose, as it would not make an adequate impact during its course, nor would it be suited for building the framework required for later scale-up. Hence, a conventional project was rejected.

While the first tranche of the proposed APL does have some elements of learning, the scale of the first tranche is much larger than that of a LIL, and the type of learning involved is that associated with any project, and not of the type generally targeted under LILs. Further, a LIL would have almost no measurable impact on rural energy access or renewable energy development, thus delaying the scale-up. Thus, the alternative of a LIL followed by a SIL was also rejected.

**2. Major related projects financed by the Bank and/or other development agencies (completed, ongoing and planned).**

Sector Issue	Project	Latest Supervision (PSR) Ratings (Bank-financed projects only)	
		Implementation Progress (IP)	Development Objective (DO)
<b>Bank-financed</b>			
Grid-based rural electrification	Uganda Power III (P002929)	S	S
	Ethiopia Energy II (P000736)	S	S
	Ghana National Electrification (P000953)	S	S
	Vietnam Rural Energy (P056452)	S	U
Independent mini-grids	Mozambique Urban Household Energy (P001793)	S	S
	Sri Lanka Energy Service Delivery (P010498)	S	S
	Laos Southern Province Rural Energy (P044973)	S	U
	India Renewable Resources Development	S	S
Solar pv	Indonesia Solar Home Systems (P035544)	S	S
	Sri Lanka Energy Service Delivery (P010498)	S	S
	China Renewable Energy (P046829)	S	S
	Nicaragua. Telecommunications Sector Reform Project (P055853)	S	S
Rural ICT			
	UNDER PREPARATION		
	Ecuador. Power and Communications Sectors Modernization and Rural Services Project (P063644)		
	Thailand. Rural Information Empowerment Project (P071185)		
	Nepal Telecommunications Sector Reform Project (P050671)		



<b>Other development agencies</b>			
Solar pv	Zimbabwe Solar PV Project (UNDP/GEF) Uganda Pilot Photovoltaic Project (UNDP/GEF) Zambia Solar PV (SIDA) Mozambique – PV systems for rural health clinics (NORAD)		

IP/DO Ratings: HS (Highly Satisfactory), S (Satisfactory), U (Unsatisfactory), HU (Highly Unsatisfactory)

### 3. Lessons learned and reflected in the project design:

#### *Grid-based rural electrification*

Overall, the "first generation" of rural electrification programs in the 1970s and 1980s did not lead to the expected development impact. Further, these program usually proved to be very expensive, which had a crippling effect on the State-owned utilities that undertook them. Thus, the subsidies provided for rural electrification not only did not provide any significant benefits to the intended beneficiaries but also often impeded the normal functioning of the power utilities.

An OED review - *Rural Electrification: A Hard Look at Costs and Benefits*, OED Precis No. 90, May 1995 - of Asian RE programs noted that most of them had higher costs and yielded fewer benefits than expected. Among the review's recommendations were:

- “project appraisal needs to focus more attention on identifying the economic limits of extensions to the grid and on the economic potential of alternative energy sources, particularly solar energy.” The project design fully incorporates this approach to cost reduction, in addition to the introduction of lower-cost technologies and processes.
- “RE reduces rural poverty only through a general rise in income obtained by productive uses.” Consistent with this, and based on the experience of the Rural Business Services program of the Indonesia Second Rural Electrification Project, this project will assist suitable SMEs in enhancing productivity and incomes by switching over to electricity.
- “a rational system of cost recovery is a key policy ingredient of any RE project.” This project calls for a system of transparent and explicit subsidies along with an emphasis on cost recovery *via* commercially-oriented rural electrification.

More recent reviews and reports of selected country experiences with rural electrification – Thailand, Costa Rica, Indonesia, Chile, Mexico, Cote d’ Ivoire, South Africa, the Philippines, and Bangladesh – provides a broader diverse base for understanding what makes RE programs successful. While the various countries used a variety of institutional models and approaches, and there are no fixed blueprints to follow, there are some common guiding principles:

- Decentralization of decision-making, with demand-driven selection criteria for service expansion rather than top-down “RE Master Plans”
- RE should be set up on a commercially viable basis, with some subsidies generally required, but recurrent cost subsidies undermine sustainability.
- Development impact can be increased by subsidizing access, (i.e., low connection charges instead

of consumption), cost-recovery based tariffs, and working with rural enterprises to enhance their productivity.

- Reduce costs by promoting low-cost equipment and technical specifications.

At present, the only ongoing Bank-financed grid-based rural electrification project in Africa is the Ghana National Electrification Project, which is expected to meet its target of 97,000 new customers in 13 district capitals, 33 towns and several townships, along with privatization of distribution. Here, the use of transmission line “shield wire” technology for rural distribution has led to as much as 50% cost reduction in this aspect.

### ***Independent grids***

There has been only limited experience with independent grids; overall, the early results are encouraging. Two independent grids were financed under a recently completed project in Mozambique, which is the only Bank-supported project in Africa to feature such grids. These grids are working well, cost recovery is high, and the Government has recently contracted out their management, following a bid process, to private sector firms.

Bank-supported projects in Sri Lanka and Lao PDR also include village-level independent grids; in both cases, design and implementation have been highly participatory. This emerges as a key lesson to enhance sustainability of the independent grids, and is reflected in the social intermediation in this project.

Outside the Bank, there is some experience with local mini-grids, both in terms of technical implementation, management, and collective management, in Nepal and Tanzania. The project team has close links and good working relationships with the key individuals and entities (SIDA, NRECA) involved in these projects.

### ***Solar PV***

A recent review *World Bank Solar Home Systems Projects: Experiences and Lessons Learned 1993-2000* - of the Bank’s experience with solar home systems projects derives some lessons from the early implementation experience.

- The initial pace of implementation is likely to be slow, as it takes time to develop and fine tune effective business models (operations, servicing and financing) for operating a solar pv business in rural areas. Some of the ways to accelerate implementation are to: (i) provide flexibility in project design in terms of delivery mechanisms/model and technical specifications about size and nature of systems supported, (ii) focus initially on cash sales, as credit collection can be costly and risky, (iii) introduce systems of various sizes, so that consumers have a choice of models, (iv) and provide business development assistance to solar pv dealers.
- Adequate after-sales service, including consumer education in proper maintenance and operating procedures, is important for consumer satisfaction, minimizing maintenance costs and enhancing overall system reliability.

- While marketing campaigns are important, in order to enlarge the market, consumer awareness must be combined with other factors such as affordability, demonstrations, opinions of neighbors, and service presence. The nature of marketing campaigns should be carefully tailored to the local conditions, but, in any case, should be sure to include potential consumers, and not just local leaders or business developers.
- Consumer credit is key to expanding the market beyond cash sales.

### ***ICT sector***

Following the recent joint OED/OEG review of the Bank Group's experience with ICT, the Bank's new Sector Strategy Paper has identified universal access as a major new strategic direction and has broadened the concept of access to include the Internet; the Paper cites this project as one of the pioneering projects in this sphere.

Increasingly, Bank projects offer support for the creation of rural telecommunications funds. Initially, this support was confined to technical assistance (Peru, Guatemala and Mauritania), it has now expanded (Nicaragua, Nepal, Bolivia) to provide seed-finance for the subsidized component of rural investments, while a new project in Guatemala involves the creation of a network of telecenters in rural areas targeted at small businesses.

The promotion of auctions for minimum subsidy concessions in these operations draws on the approach pioneered by Chile in 1994, and subsequently been adopted or being considered by about twenty countries around the world.

### **4. Indications of borrower and recipient commitment and ownership:**

There are four strong indications of borrower commitment and ownership. *First*, the Government amended the draft Electricity Act to reflect the Bank's views about the policy framework for commercially-oriented rural electrification, and the Electricity Act of 1999, as passed, includes most of these changes. This is a clear indication that the Government is committed to this demand-driven, private sector led rural electrification program.

*Second*, there was a one-day workshop on June 25, 1999 in Entebbe, hosted by the Ministry of Energy and Mineral Development (MEMD), the Ministry of Local Government (MOLG), the Uganda Local Authorities Association (ULAA), and the World Bank. The purpose of the workshop was to enable key stakeholders to discuss the principles and approach underlying this project. The workshop attracted approximately 150 participants, including the Ministers and senior officials from MEMD and MOLG; a Minister from the Prime Minister's Office; Chairpersons of district councils (LC5s); Members of Parliament; NGO representatives; local banks and credit organizations; local businesses; and bilateral donors. The participatory workshop endorsed the project.

*Third*, in June 2000, the Minister of Finance organized and presided over a meeting of bilateral donors to encourage them to support this project. This meeting included participants from the UCC and a number of the cross-sectorally linked line ministries.

*Fourth*, the project has received strong support from key cross-sectoral ministries including Agriculture, Health, and Uganda Communications Communications, which have made this project a part of their

mainstream activities.

**Commitment to renewable energy development.** Renewable energy is widely viewed in Uganda as a local, indigenous resource, a particularly important consideration for a land-locked country that is now heavily reliant on imported energy sources, imported long distances over land. To minimize these risks of supply interruptions and price volatility, Uganda recognizes that additional efforts are required to encourage development of indigenous energy resources where they are available and economic. For this reason, the Government has forcefully declined to consider thermal-based main-grid power generation, even in the current period when there is a severe shortage of power. The Government's vision, including its commitment, is included in Annex 13.

Uganda has already taken the significant first step in their passage in November 1999 of private power legislation that will set the stage for rapid development of additional power resources. Further, in Uganda, key measures related to power sector reform, such as a new Electricity Act, have already been enacted, and they provide a level playing field for renewable energy. What remains to be worked out are the details of how the broad measures will actually be implemented. As such, there are no government policies in place that are explicitly or implicitly discriminate against renewable energy investments in any meaningful way; instead, there are other barriers to renewable energy development such as lack of resource information on which to base investment decisions, uncertainty in power purchase arrangements, and insufficient implementation capacity. The lack of renewable energy resource information is being addressed through a parallel and complementary Alternative Energy Resource Assessment and Utilization Study supported by the African Development Bank.

The GOU is committed to establishing and maintaining specific incentives/commitments to encourage renewable energy sources and to create and maintain a 'level playing field' that will permit RE technologies to compete with conventional energy sources. To fulfill this commitment, Uganda fully accepts the need for the institution of sufficient policy measures to provide and sustain a level playing field for renewable energy. In this context, the key barrier to renewable energy that the Government can act upon is the lack of indigenous capacity. For this reason, the release of GEF tranches will be linked to the development of local capacity to promote and undertake renewable energy investments – which is also in keeping with the principles of the Bank-GEF Strategic Partnership for Renewable Energy. The proposed triggers for Phase III specifically include renewable energy capacity building.

**ICT sector.** The strong government commitment to the promotion of rural access to ICT is clear from the inclusion of the Rural Communications Development Fund (RCDF) in the 1997 Uganda Communications Act, and in the considerable progress that has already been made towards the establishment of the RCDF. More broadly, Uganda is placing considerable emphasis on ICT in its development strategy with President Museveni calling in 1997 upon the international community to assist Uganda in harnessing ICT for development purposes. At present, the Uganda National Council for Science and Technology is working on a national strategy for the sector.

## **5. Value added of Bank and Global support in this project:**

Uganda sees the Bank as a major strategic partner in development, and this project, with its focus on rural transformation, is an important element of this partnership. The Bank is supporting power sector reforms and UEB restructuring, which will initially benefit mainly the urban areas; it is important that Bank also support rural electrification and renewable energy development, so that the Bank's support extends beyond the minority who will be served by the main grid.

One of the main contributions of the Bank to this project is its ability to function as a "knowledge bank" that helps Uganda develop fresh approaches to solving its problems, incorporating the experience of and key lessons learned in other countries. For instance, the Bank has helped the Government to shift its focus from rural electrification *per se* to rural transformation, including cross-sectoral links; similarly, the Bank can bring to bear its accumulated significant experience in the development of rural telecommunications funds through its active support in a number of countries in Latin America, Africa and Asia.

A second major Bank contribution is to work with the various donors in Uganda in relation to rural electrification and renewable energy development. Bilateral donors will provide grant funds for a number of the activities envisaged under this project, including the RE Fund. Bilateral donors, particularly Denmark, Sweden and Norway have provided significant support for this project in the form of grants for the Bank's Africa Rural and Renewable Energy Initiative (AFFREI), which has financed the bulk of the higher-than-average project preparation costs.

Use of GEF and other carbon finance resources is anticipated to be an important part of renewable energy's sustainable transition to commercial replication and sustainability. GEF support for this project will follow and build on the ongoing UNDP-GEF Uganda Pilot Project for Photovoltaic Rural Electrification, which is limited to solar PV.

In this project, GEF will broaden its support in two ways: one, by going beyond solar pv to include renewable energy power generation, and two, by providing support in an APL format under the Bank-GEF Strategic Partnership for Renewable Energy. As a result, GEF resources will be allocated on the basis of agreed long-term renewable energy development plans, shifting from single transactions to more continuous strategic development of the most promising technology and market opportunities, and targeted at building effective bridges to private sector market development and financing.

**Leverage of GEF Resources.** The principle of significant leverage of GEF resources with other financial resources, combined with the decline in the need for concessional financing requirements over time and the transition to a fully functioning commercial RE market is one of the key objectives of the World Bank-GEF Strategic Partnership for Renewable Energy and is applicable to this project.

In terms of investments, the GEF supported activities fall into two groups: renewable energy power generation for the main grid and for independent grids, and stand-alone solar pv systems. In the first phase of the APL, a large part of the GEF support will be for sugar mill power cogeneration; it is expected that the GEF share of the total costs will be of the order of 20%. For solar pv, and power generation for isolated grids, the GEF share is expected to be of the order of 20-25%. These leverage levels are believed to be at the margin of what can be effectively achieved given current renewable energy market barriers in Uganda, and the level of financial leverage is expected to increase over the three tranches. Actual leveraging will depend upon decisions of private sector investors who have not yet finalized their business plans, at this stage it is possible to give only indicative assessments of the leveraging and project costs.

Within the total project costs, it is expected that costs for the renewable energy investments and corresponding GEF support will be about \$ 153 million (GEF \$ 23.5 million) overall, broken down as:

**Tranche 1:** \$ 42.5 million (GEF \$ 7.0 million)

**Tranche 2:** \$ 49.0 million (GEF \$ 7.0 million)

**Tranche 3:** \$ 63.6 million (GEF \$ 6.4 million)

It is expected that the GEF supported investments will lead to additional renewable energy investments,

which will not be supported by GEF grants (multiplier effects). GEF investments will support power generation capacity only; costs for ancillary investments in transmission and distribution (which are potentially significant) and could be considered as leverage on investments, are not included in the above leverage indications, as they would be required regardless of whether the power was from conventional or renewable sources.

## **E. Summary Project Analysis** (Detailed assessments are in the project file, see Annex 8)

### **1. Economic (see Annex 4):**

- ☐ Cost benefit      NPV=US\$ million; ERR = % (see Annex 4)
- ☐ Cost effectiveness
- ☐ Incremental Cost
- ☒ Other (specify)  
(e.g., fiscal impact, pricing distortions)

**Economic analysis.** It is clear that, at present, fully commercial rural electrification is not feasible in Uganda, i.e., there are no private investors who are willing and able to undertake the necessary investments on their own. The primary barrier is not a lack of an enabling policy framework, as key elements of this are now in place - rather the key barriers are the risks as well as the perceptions of risks associated with an activity with which there is no experience in Uganda. These risks affect the decisions not just of potential investors but also of financiers, who are reluctant to provide credit for such investments.

While this represents a financial analysis, and not an economic analysis, in Uganda there are few differences between economic and financial costs with regard to rural electrification. The only significant distortion is that there is a significant tax on diesel that raises the financial cost of diesel-based generation much higher than its economic cost. However, this would not affect the economic or financial cost of renewable energy based activities, which is the focus of most of the investments in Phase I.

It is expected that economic benefits would be significantly higher than the financial revenues, so that the ERR would be higher than the financial returns. Thus, the rural electrification projects could have an economic justification, even if they are not financially attractive, provided the economic benefits are high enough. However, at present, there is considerable uncertainty about the economic benefits (private investors are also worried about that financial revenues that they would actually be able to collect), primarily because it is difficult to estimate them reliably in the absence of any actual experience with the type of cross-sectorally linked rural electrification envisaged in this project.

In particular, instead of merely providing electricity access, this project includes pro-active policies to promote and realize the indirect benefits from rural electrification: the indirect benefits arise from the improved service delivery in key end-user sectors such as health, agriculture, SMEs, education and water - and these accrue even to those not directly served or connected. In the case of rural Uganda, these indirect economic benefits could turn out to be as important as the direct benefits that accrue to those who are personally connected and served.

There is considerable uncertainty about the extent of the indirect benefits. In the absence of efforts in most past rural electrification projects to realize/measure them, there is no well-established method of estimating them - for example, what are the economic benefits of lighting in a health clinic that reduces the risk of complications in maternal delivery at night? Further, the extent of the benefits will depend upon how successful this project is in implementing cross-sectoral links with the end-user sectors in Uganda - an exercise for which there are few precedents.



For direct benefits, there is clear evidence - based on current expenses on energy - that in Uganda there are selected rural areas, particularly around the more dynamic trading centers, with small/medium enterprises and some households with relatively high willingness-to-pay (See documents in Annex 8 and the West Nile section of Annex 2). This is to be expected in Uganda, where the UEB-operated main grid has barely begun to reach the rural areas, and even relatively well-off rural areas do not yet have electricity access.

It is also clear that current expenditures, in particular those based on older forms of energy, are an under-estimate of the direct economic benefits to the users because they do not include the consumer's surplus. In Uganda, in the absence of any meaningful experience with rural electrification, estimates of consumer's surplus would require not only extensive primary data collection but also the use of sophisticated econometric techniques, such as contingent valuation methods. Given the high costs of the effort and the likely speculative nature of the results, it was decided not to undertake this exercise during project preparation.

**In short, in the absence of any significant experience with rural electrification in Uganda, and none with cross-sectoral links, it is difficult, at this time, to obtain reliable estimates of two key elements of economic benefits: the consumer's surplus and the indirect benefits.** These tasks will be undertaken as part of the monitoring and evaluation of the project during Phase I, building on the analysis now being carried out in an ESMAP-funded study to develop and implement - for the Philippines - a benefit assessment method designed to improve valuation of benefits from rural electrification. Preliminary results from this study show that potential economic benefits from rural electrification are much higher than the benefits measured by financial revenues, and far exceed the costs of rural electrification.

## **2. Financial (see Annex 4 and Annex 5):**

NPV=US\$ million; FRR = % (see Annex 4)

(e.g., cost recovery, tariff policies, financial controls and accountability)

**A key issue is the need for a workable financial intermediation system for rural electrification and renewable energy development.** Term financing at an affordable rate is critical for private sector rural electrification projects to be successfully developed. Without it, the tariff rates in rural electrification projects, as with all infrastructure projects where capital costs account for the majority share of the project cost, would have to be set at high levels, which would make the projects financially unviable.

The investments supported under this project will have significant medium-term credit requirements, consisting of three segments:

- large business credits of over \$ 1 million for the renewable energy generation projects (sugar mill cogeneration, such as Kakira and mini-hydro, such as in the West Nile, with term requirements of 10-15 years;
- medium-sized credits (under \$ 500,000) for mini-grid service providers, with term requirements of 10- 15 years, and solar pv, with term limits of 6 months to 3 years; and
- consumer credits (under \$ 600) for solar pv and initial grid connection costs, with term requirements under 2 years. This segment does not require any interventions under this project, as there are considerable microfinance credit and savings facilities in place in Uganda, and these are being strengthened through on-going interventions by the Bank and other donors, including the European Union and USAID.

For the above first and second segments - large and medium credits- the project has a two-pronged approach to developing the needed financial intermediation mechanism, based on the design/lessons learned in a number of Bank rural/renewable energy projects and an assessment of the current status and expected developments in the financial sector in Uganda:

- make all efforts to finance rural electrification and renewable energy development as part of the normal functioning of the financial sector, including by IFC, i.e., avoid introducing distortions in the financial sector.
- take account of the practical barriers and gaps, such as liquidity mismatch and risk perceptions that prevail now and may persist for some time, and provide Ugandan institutions with interim financial mechanisms - with a clear exit strategy - that allow them to overcome the barriers and gaps.

**Efforts to mainstream the financing of rural electrification and renewable energy development.** The key activities are:

- The ERT project team has pro-actively supporting IFC's Uganda rural electrification projects - being developed in parallel with this project - through upstream work in the IFC project, and IFC's first project (see Annex 2) is slated to receive subsidies under this project. IFC's participation in rural electrification in Uganda will provide much needed comfort to the local banks that this is an area that is fit for local banks to participate in. Further, the project team has discussed with IFC the possibility that they might finance some of the renewable energy generation (large credits). At present, there are no clear signals that IFC will extend its activities beyond its current rural electrification project.
- A number of interventions will be made under this project to increase the capabilities of the financial sector to finance these term credit requirements. For instance, demand side stimulation (e.g., promotion, market surveys, business planning assistance, technology assessments and advice), usually on a cost shared basis with the businesses, following the approach of BUDS under the Competitiveness Project, will be particularly important. Further, capacity building for financial intermediaries to increase their awareness, knowledge and comfort with RE business lending will assist to remove some of the financial sector barriers. Also, market and business information provided directly to the financial intermediaries will lower their initial transaction costs and the end user auditing conducted during the program will provide a level of information on firm level sales and business operations that will dramatically lower their monitoring costs and increase their knowledge of client performance.

**Key financial sector constraints.** One of the key constraints to developing private rural electrification systems in Uganda is the lack of necessary market mechanisms to provide debt financing with required maturity, structure, and volume required. Existing financial institutions and banks are constrained by the time profile of their liabilities and cannot prudently lend long-term debt. Given the complexity of the risks involved in rural electrification systems, existing financial institutions also perceive the project cash flows and the collateral as insufficient inducements to invest the amount needed.

**Credit Support Facility.** In the absence of a market for long-term loans in Uganda, it is necessary to develop interim financial mechanisms, with a clear exit strategy, that would be consistent with the long-term development of the financial sector. Based on discussions with the representatives of bank and

non-bank financial institutions, MOF and Bank of Uganda, it was decided to develop and implement a credit support facility that would make it feasible for financial institutions to provide the necessary credit for private-sector led rural electrification. For example, one of the issues that needs to be addressed is that even sound financial institutions face the risk of a liquidity shortfall in the event of a broad sector crisis, and this constrains their ability to offer term credits such as those required for many RE investments. **As part of TA under this project, MOF will retain a consultant, to design a facility, acceptable to the Bank, whose guiding principle would be to support, rather than supplant, normal commercial credit procedures.**

In the interim until the above facility became functional, IDA funds would be made available to refinance, on market terms, commercial loans – with the commercial banks taking the market risk – for a limited number of pre-specified investment projects that are in an advanced state of preparation. These are expected to include Kakira, West Nile, Kisiizi, IFC-Bushenyi (see Annex 2 for details), and several mini-grids under discussion. The commercial Shilling loans would be 90% refinanced on a matching maturities basis, at a variable interest rate equivalent to the average weighted deposit rate of six leading banks (Standard Chartered, Stanbic, Barclays, Orient, Citibank and Baroda) that are accredited for the on-going EIB apex scheme; the average weighted deposit rate was chosen after considering Bank of Uganda time series data showing its lower volatility and range of variation over the two year 1999-2000 period as compared with the 91-day Treasury bill. For dollar denominated loans, the Bank of Uganda will formulate a framework to determine market-based refinancing terms.

**A second financial issue is the extent to which cost-recovery based tariffs will be successfully implemented.** While the Government has agreed to permit such tariffs and local communities have said that they are willing to pay, it still remains to be seen what the reactions will be when the tariffs have to be actually paid.

**ICT sector.** A key question is the financial sustainability of the infrastructure investments, in terms of their ability to generate sufficient revenue to cover operating costs and the non-subsidized component of capital costs from user charges. In order to ensure that projects are financially sustainable, investment subsidies will be confined to those projects which can demonstrate their ability to cover operating costs.

#### **Fiscal Impact:**

No significant fiscal impact is expected because the investments under this project will be undertaken by the private sector, and the bulk of the subsidies will be provided by bilateral donors or ear-marked levies, with some IDA finance. However, there are two possible sources of some adverse impact: (i) the Government may choose to provide some funds for subsidies, and (ii) the power-purchase agreement with biomass cogenerators has some liability for the Government arising from the take-or-pay clause.

#### **3. Technical:**

(e.g., appropriate technology, costing)

For the energy sector, the main technical issue is the introduction and mainstreaming of low-cost designs and procedures. Since a large pool of tested innovations available from the experience of other countries has been identified, and the private sector is interested in cutting costs, it is expected that there will be significant mainstreaming of lower cost approaches. For the ICT sector, some technical concerns may arise from the expansion of Internet services to rural areas, which have not yet had experience of operating the technology and which are geographically remote from supplies and expertise. To counteract this problem, the concession contracts will include quality standards to ensure that the ultimate service objectives are

met.

#### 4. Institutional:

(e.g., project management, M&E capacity, administrative regulations)

For the energy sector, the main issue relates to the establishment and efficient functioning of “light-handed” regulation and the RE Fund; since both of these are innovative institutions for Uganda, there is some risk and uncertainty as to how they will actually function. While all efforts will be made to minimize this risk by introducing tested designs, providing technical assistance, and building the capacities of the responsible functionaries, at this stage it is not possible to rule out the concern that one or both of these institutions will not function effectively, either because of mismanagement, parochial interests or some other factors. Since these institutions are key elements of the framework for commercially oriented rural electrification in Uganda, ineffective functioning of these institutions will have a significant adverse impact on the project’s ability to meet its targets.

For the ICT sector, UCC, the implementing institution, was established with support from a previous Bank operation. Through its support of the consultant's work required to define bidding documents, the Bank will ensure that the procedure for tendering rural concessions is competitive and transparent. The Bank contribution towards the finance of the investment subsidy component will be disbursed directly to the winning private sector operator against the audited achievement of the output objectives specified in the contract.

##### 4.1 Executing agencies:

Project execution will be through:

- the **Ministry of Finance**, which will oversee: i) the refinancing of initial subprojects through the **Bank of Uganda** on the basis of a Project Agreement; ii) a Credit Support Facility, to be contracted to a local bank or other suitable institution; and iii) the Business-to-Business technical assistance to be provided through the **Private Sector Foundation** on the basis of a Project Agreement with the Bank and a Subsidiary Finance Agreement for on-grant of funds from the Government. In both cases, these activities will be contracted to qualified organizations with relevant experience gained in other sectors.
- the **Rural Electrification Board**, which will oversee the activities of the RE Agency and the RE Trust Agent. The RE Board and Agency will be new entities, (the Trust Agent function would be contracted to a local bank) and as such there is some uncertainty in their ability to execute their functions which are critical to project success. This uncertainty will be mitigated in two ways: a) through hiring of RE Agency staff on commercial salary scales to ensure a high caliber staff; and b) by providing on-site consultant support through the project.
- the **Ministry of Energy**, which will undertake the renewable energy capacity building and pilot activities and also establish the RE Board and Agency and, prior to their creation, act on their behalf;
- the **Uganda Communications Commission**, which will oversee the Rural Communications Development Fund, is a recently formed body with a limited track record. Consultant assistance also will be provided through the project to assist in project execution. These arrangements are provided through a Project Agreement with the Bank and a Subsidiary Finance Agreement for on-grant of the funds from the Government.
- the **Ministry of Local Government and Ministries of Health, Agriculture, Education, and Water**, which will promote and in some cases execute energy-related investments in conjunction with their normal functions. In particular, they will secure consultant assistance for energy

package design and implementation assistance. The Ministries of Health and Education will also receive cofinancing support for energy packages on rural health clinics and post-primary schools. Support for agricultural investments will be provided through the RE Fund (see Annex 2 Ministry of Agriculture discussion), and assistance in implementing these investments will be provided through the PSF;

- investments under this project will be executed by the **private sector** which is expected to bring relevant experience from other activities to bear in this new market area. Additional support to project sponsors will be provided through the Business-to-Business technical assistance which is targeted at filling experience or ability gaps to maximize the potential for subproject success.

#### 4.2 Project management:

As the lead organization in the Government's rural electrification program, the Rural Electrification Agency will undertake the main management functions under the guidance of the RE Board and ultimately the Minister of Energy and Mineral Development. These will include overall monitoring and evaluation of national rural electrification progress and rural transformation impact assessment. In its role as the preparer of the draft annual Minister's Rural Electrification report to Parliament, the RE Agency will consolidate data from the other key actors in the program. The Ministry of Finance, through its contract for the Credit support Facility, will oversee, monitor, and report on the financing and Business-to-Business TA support to the project. MOF also will oversee the Refinance Facility for the initial investments, which will be channeled through the Bank of Uganda. The UCC will hold similar responsibilities with regard to the RCDF and associated technical assistance. With the exception of the Ministry of Finance, which has overseen previous credit programs through the Bank of Uganda, the other two entities - the RE Agency and the UCC - are new. As described above, the limited track record of these entities will be bolstered with consultant assistance to ensure adequate program and project management even as capacity is being built.

#### 4.3 Procurement issues:

Procurement arrangements are described in Annex 6. Procurement will be carried out by public entities as well as private investors. Out of the eight public entities participating in the operation, five of them have ongoing IDA financed projects with personnel having experience in Bank Procurement Guidelines. The rest will need to be strengthened through training of existing staff and employment of procurement consultants to assist in the implementation. The major issue at this moment is that the main executing agency, the Rural Electrification Agency (REA) has not yet been created and therefore its capacity can only be assessed on paper. In the interim period, the Ministry of Energy and Mineral Development (MEMD) will play the role of the REA but currently the capacity at the MEMD is not adequate to carry out procurement for its own component as well as coordinating the activities of the whole operation. As regards the private sector, Annex 6 requires that all contracts estimated to be above the following thresholds be procured through international competitive bidding in accordance with Bank procedures:

Goods - \$2 million,

Works - \$3 million,

Turnkey and Supply & Installation - \$5 million.

Most of the investors are unlikely to be aware of Bank procurement procedures. The Private Sector Foundation will need to build additional procurement capacity to ensure that timely assistance is provided to these investors. Private investors will be required to include procurement plans in their business plans. The REA and the intermediary commercial banks will review such plans to ensure that the necessary capacity is available for international competitive bidding, when required.

#### 4.4 Financial management issues:

The overall responsibility for program management, promotion, provision of business development assistance, and monitoring and evaluation will be vested in the Rural Electrification Agency (REA) which is yet to be created. The agency will be responsible for ensuring proper accountability for funds relating to components which it will directly implement and for coordinating the accountability for transactions relating to activities implemented by the line ministries. A strategy document for the agency describing the organizational structure and key staff duties within that structure is given in the PIP. It is expected that an accounting department, headed by a suitably qualified and experienced person and staffed equally with appropriately qualified staff will be provided for within the structure. The department will be staffed by persons whose experience and qualifications will be commensurate with their responsibilities. The strategy document shall form the basis of the assessment.

In addition to the REA, the Bank of Uganda (BOU) under the supervision of MOF will have the responsibility for managing the IDA Refinance facility and the GEF grant facility while the Private Sector Foundation (PSF) will have the responsibility for business development assistance. These two entities have a satisfactory track record in ensuring proper accountability for funds under World Bank projects they have implemented. Furthermore, the Uganda Communications Commission (UCC) will be responsible for the ICT component of the project. A preliminary assessment of the financial management arrangements for the UCC indicates that they are sufficient to meet IDA's minimum requirements with regard to financial management under OP/BP 10.02. Plans of actions to strengthen the financial management systems for the implementing agencies where necessary will be agreed during negotiations.

It is intended that the IDA Credit will be disbursed to the implementing agencies based on submitted quarterly Project Management Reports (PMRs) under IDA's Financial Management Initiative (FMI). However, at present the implementing agencies are not yet ready for PMR disbursement. Details of the Financial Management assessment are given in Annex 6. This includes an agreed plan of actions to be undertaken to achieve identified improvements that are necessary.

#### **5. Environmental:** Environmental Category: F (Financial Intermediary Assessment)

##### 5.1 Summarize the steps undertaken for environmental assessment and EMP preparation (including consultation and disclosure) and the significant issues and their treatment emerging from this analysis.

During project preparation, an Environmental and Social Management Framework (ESMF) was prepared. The ESMF, which applies to all investments financed by the Credit and Grant, provides a clear framework for environmental and social safeguard screening, assessment, and mitigation as appropriate. While Bank and Ugandan standards are broadly consistent, there are a few areas where they differ. In view of this fact, the ESMF is specifically designed to satisfy both Bank and Ugandan requirements and will be applied to ensure this result. In particular, the responsibilities of the Rural Electrification Agency will include ensuring that the ESMF is properly complied with, and the Agency will require evidence of an adequate safeguard assessment and mitigation plan approved by NEMA covering all appropriate safeguards before forwarding an application to the Rural Electrification Board for action on a grant application. Initial assessments will also be reviewed by the Bank (see Section 5.3). Due to the small number of ICT transactions, the RE Agency will also ensure that these transactions comply with the ESMF. Monitoring of safeguard compliance will be undertaken by the RE Agency in connection with the overall monitoring of project activities. Consultation with affected people and communities as well as a structure for addressing complaints and grievances is an integral element of the ESMF. In particular, the ESMF calls for public consultation between the community and the prospective project sponsor throughout the environmental assessment process as well as for public hearings if the Lead Agency - in this case the RE Agency - determines they are necessary.



There are no major negative environmental issues. However, the project can be expected to contribute to environmental *improvement* in several ways:

- Use of renewable energy (sugar mill cogeneration, small & mini-hydro, coffee-husk gasification, solar PV, possibly geothermal and wind) will displace generation which otherwise would have been fossil-fuel based. This would result in local and global environmental benefits from reduction of atmospheric emissions of SO<sub>x</sub>, NO<sub>x</sub>, particulates, and carbon.
- Sugar mill cogeneration will provide for controlled and more efficient combustion of bagasse which would otherwise be burned in the field.
- Widespread use of solar home systems should markedly reduce indoor use of kerosene and other lighting fuels, improving the indoor environment.
- Increased efficiency in use of traditional fuels should lead to a reduction in biomass harvesting, which is currently at unsustainable levels at least in some regions.

However, there are some *concerns*:

- Construction and operation of generation plants (small hydro, bagasse cogeneration, biomass gasification, diesel) as well as electricity distribution systems (poles and wires) will have some potential for adverse environmental impacts on the biophysical environment, including habitat disturbance, vegetation change, biodiversity loss, soil degradation/erosion/siltation, and air and water pollution.
- Subprojects may also result in impacts on the human environment, including possible loss of agricultural lands, resettlement, increase in water-borne diseases, population influx, and loss of aesthetic values.
- Management, recycling, disposal, and of batteries for PV systems requires attention, particularly when the industry growth accelerates over time. Regional recycling, education and buy-back plans are the options that will be investigated to mitigate this concern.

## 5.2 What are the main features of the EMP and are they adequate?

In line with the requirements for an FI project, the Borrower has prepared an Environment and Social Management Framework. See Annex 16 for a summary of the ESMF, which has been cleared by ASPEN management.

## 5.3 For Category A and B projects, timeline and status of EA:

Date of receipt of final draft: 25 May 2001

### **Proposed Actions**

See Section 5.1 above. An Environmental and Social Management Framework has been prepared by Government. This includes creation of an "Environmental and Social Unit" in the RE Agency which would review subprojects for compliance with the ESMF before forwarding to NEMA for approval. To ensure full compliance, the first five ESMF reviews will be forwarded after NEMA review to the Bank for a final review. This will add an additional level of quality assurance as well as allow the Bank to directly assist in building Ugandan capacity in this area. The need for Bank reviews of future subproject ESMF reports will be determined after the initial five are completed.

5.4 How have stakeholders been consulted at the stage of (a) environmental screening and (b) draft EA report on the environmental impacts and proposed environment management plan? Describe mechanisms of consultation that were used and which groups were consulted?

The Safeguard Frameworks were publicly disclosed in country and in the InfoShop as of June 7, 2001.

5.5 What mechanisms have been established to monitor and evaluate the impact of the project on the environment? Do the indicators reflect the objectives and results of the EMP?

The Rural Electrification Agency will include a Safeguard monitoring function. This function will be combined with the Environmental Liaison function within an Environmental/Safeguard function housed in the RE Agency. The Terms of Reference for the capacity building consultants will include support for establishment and training of this function.

## **6. Social:**

6.1 Summarize key social issues relevant to the project objectives, and specify the project's social development outcomes.

The project involves the construction of electricity distribution systems for rural communities. In addition, in some cases electricity generation systems also will be required, which may include diesel, mini-hydro, or other renewable energy based generators. Most of the distribution systems are expected to be along existing roadways, with minimal additional land requirements. However, some distribution lines are likely to traverse private land, and the generation systems also are expected to require land acquisition for the locations of the power poles. Finally, temporary land disturbance can be expected during construction with potential impacts on farming income.

The framework for addressing these issues is described in the ESMF (see Annex 16). Essentially, this entails compliance with The Land Act (1998) which provides for financial compensation of affected people. However, in cases where more than 20% of property and production is affected, the ESMF provides for income restoration in accordance with Bank guidelines. The responsibility for ensuring compliance of project investments rests with the Rural Electrification Agency.

Satisfaction of community members, as customers of a rural electrification enterprise, is a critical element of the enterprises long-term sustainability. For this reason, project sponsors are expected to work directly with the beneficiary community in establishing a rural electrification scheme. Support in this area is provided for through the PSF's Business Development Assistance. Also, incorporation of community responses will be critical to the further development of the Energy for Rural Transformation Program. For this reason, the Rural Electrification Board includes an NGO representative who is specifically charged with representing rural constituents - especially the poor. Regular interaction and reporting on issues raised by rural constituents will be facilitated by the Rural Electrification Agency through contracts with local NGOs.

6.2 Participatory Approach: How are key stakeholders participating in the project?

The primary beneficiaries are rural households, SMEs, health and education facilities, energy service providers, and renewable energy small scale power generators. During field trips, the Bank missions and the Government have met with and discussed the main elements of the proposed project with them in public meetings, and taken account of their interests and concerns in preparing the project concept; a participation specialist consultant was involved in many of these meetings. Further, the findings and concerns expressed in the *Uganda Participatory Poverty Assessment* have also been taken into account.

Apart from direct meetings at the individual level, there have also been discussions with representatives of

the beneficiaries (see below). Given the importance of community acceptance of commercially-oriented rural electrification (see section E5), extended participation is essential, and will continue through project implementation.

### 6.3 How does the project involve consultations or collaboration with NGOs or other civil society organizations?

Apart from the Ministry of Minerals and Energy Development, the project team has worked closely with a number of other agencies: the Ministries of Local Government and Health, the Uganda Local Authorities Association, Uganda Renewable Energy Association, and ActionAid, an NGO. All of them have contributed to project design. It is expected that some of them will also be involved in the information dissemination for the project, once implementation begins.

### 6.4 What institutional arrangements have been provided to ensure the project achieves its social development outcomes?

Not applicable

### 6.5 How will the project monitor performance in terms of social development outcomes?

Not applicable

## 7. Safeguard Policies:

### 7.1 Do any of the following safeguard policies apply to the project?

Policy	Applicability
Environmental Assessment (OP 4.01, BP 4.01, GP 4.01)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Natural Habitats (OP 4.04, BP 4.04, GP 4.04)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Forestry (OP 4.36, GP 4.36)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Pest Management (OP 4.09)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Cultural Property (OPN 11.03)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Indigenous Peoples (OD 4.20)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Involuntary Resettlement (OD 4.30)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Safety of Dams (OP 4.37, BP 4.37)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Projects in International Waters (OP 7.50, BP 7.50, GP 7.50)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Projects in Disputed Areas (OP 7.60, BP 7.60, GP 7.60)*	<input type="radio"/> Yes <input checked="" type="radio"/> No

### 7.2 Describe provisions made by the project to ensure compliance with applicable safeguard policies.

The program involves private sector investments in rural electrification including small-scale power generation. As a financial intermediation operation, specific subprojects are not known in advance, but *may* have a wide range of impacts. In most cases, impacts are expected to be small, but even so these cannot be ignored. Subprojects *may* have impacts in some or all of the areas identified above, and a Safeguard Framework has been drafted to ensure compliance with applicable policies.

## F. Sustainability and Risks

### 1. Sustainability:

The **main concern** about sustainability is whether the project is too large and too complex, given Uganda's limited absorptive capacity (see section B3). Since none of the sub-components of this project is particularly complex and/or risky on its own, the "complexity" concern arises from the (i) number of sub-components, which represent different service delivery modes, included in the project, and (ii) stretching of the project's boundaries to include ICTs and cross-sectoral linkages to health, agriculture, education, and water. In other words, "complexity" and scale are linked together, and both arise directly from the project's objective of a significant development impact in terms of rural transformation.

The project design incorporates two features to mitigate this sustainability risk. *First*, it is clear that the risk implications of the complexity are the greatest in Phase I of the APL, in which a number of innovative concepts and procedures will be introduced, and that the risks will be reduced over time as the familiarity increases. In recognition of this, within Phase I the cross-sectoral links, a significant source of the complexity, are present in the form of pilots only in order to keep the risks manageable, and further, the investment scale is the smallest of the three phases. Correspondingly, in Phases II and III, as the familiarity with the various sub-components increases, and the concomitant risks reduce, the investment scale increases in an exponential manner. *In short, complexity and investment scale have been counter-balanced in the three phases.*

*Second*, the project design avoids the key problems that dogged the Integrated Rural Development Programs (IRDP) in the 1970s and 1980s (see *Decentralization: A New Strategy for Rural Development*, World Bank, 1995)

- Adverse policy environment
- Lack of government commitment
- Lack of appropriate technology
- Neglect of institutional development
- Lack of beneficiary participation
- Complexity and coordination problem

In particular, the outcomes of the various investment sub-components are not inter-linked, so that the sub-components can proceed at their own pace, and there is no concern that delays and/or difficulties in any one investment sub-component would adversely affect any other sub-component. Further, while there are a number of entities – private sector, financial institutions, NGOs, local governments – involved in project implementation, the project design does not call for extensive coordination meetings or discussions. *Instead, the coordination is built into the project design through the normal functioning of enabling frameworks and markets being created by the project, so that individual entities are essentially required to play their own "natural" roles that are within the scope of their usual activities.* This arrangement does not overstretch the capabilities of any particular entity, nor does it require any entity to take on functions that are outside its customary ambit.

A **second** concern relates to the sustainability of the various sub-projects supported under this project. In particular, it is important that the individual sub-projects continue to provide adequate and reliable service over the years, meeting the demand as it grows over time, and that renewable energy development continue even after GEF grants are no longer available.

The basic approach to ensuring sustainability is to root service provision along commercial lines and introduce low cost technologies and processes, so that the incentive and ability to make profits makes it worthwhile for the service provider to continue in business. In addition, business development assistance would be provided not just in the initial stages of service provision, but also at critical growth junctures, so that increasing demand would not overwhelm the service providers.

A **third** concern is sustainability for **renewable energy** after the project, when GEF grants would not longer be available. The overall approach is that, over time, sustainability will come from barrier removal, cost reductions, rising incomes, and declining GEF grants. For renewable energy power generation, the key to sustainability will be barrier removal and declining costs, as familiarity with the technologies and institutional framework increases, and the GEF grant per unit is slated to decline over time. For solar pv systems, the decline in costs will come from: (i) economies of scale –which are often realized when a credible expectation of a large market has been created, (ii) formation of links to suppliers in Asia, where are prices of high-quality systems are much lower than in Africa, and (iii) rising incomes, which would increase the affordability of the systems. Further, the GEF grant per unit for solar pv systems is also slated to decline over time.

A **fourth** concern is the absorptive capacity of the emerging Uganda renewable energy market. The issue of absorptive capacity is considered separately for solar pv and renewable energy power generation. For solar pv, the absorptive capacity depends heavily upon (i) the price and nature of the pv systems to be sold to households, and (ii) the ability to put together financing packages (over and above the GEF incremental cost-based support) that make it possible for rural public institutions such as health facilities and schools to purchase these systems. It is recognized that exponential sales growth rates will be required for the Ugandan market to reach the ERT project targets; such rates are achievable when the initial base is small, with clear possibilities of significant price reductions. Though the Kenyan situation is not directly applicable to Uganda, the exponential sales growth achieved there, even in the absence of any form of subsidies and grants, indicates that the absorptive capacity is present in East Africa.

For renewable energy power generation for the main grid, the main issue is the absorptive capacity after large-scale hydropower capacity additions (Bujugali), at which time there may be a surplus of generating capacity for a period of time. The Government of Uganda is firmly of the view that there will be no excess capacity, i.e., there will be sufficient absorptive capacity in the domestic market coupled with export demand from neighboring countries; the Government has already initiated discussions with neighboring countries for power sales to ensure a market for power produced in Uganda. This issue has to be seen in the context of the transition in Uganda from a “single-buyer” model, under which the market could be ascertained with a high degree of certainty, particularly as the single buyer was a Government agency, to a “multiple-buyer, multiple-seller” model, under which the normal market risks present for any commodity are also applicable to the power sector, including renewable energy power generation.

For renewable energy power generation for independent grids, there are few concerns about absorptive capacity, as the grids will be set up in areas of high demand near vibrant trading centers.

## 2. Critical Risks (reflecting the failure of critical assumptions found in the fourth column of Annex 1):

Risk	Risk Rating	Risk Mitigation Measure
<b>From Outputs to Objective</b> Regulatory and institutional framework is new and requires experience, and hence	S	While best practice approaches have/will be utilized in designing the framework, the

<p>may not function properly</p> <p>Phase I investments are not viewed as successful by potential private sector investments, which undermines scale-up</p> <p>Action plan for renewable energy capacity is unrealistic.</p>	<p>S</p> <p>M</p>	<p>undertaking of commercially-oriented rural electrification/ICTs with transparent and objective subsidies is still a path-breaking activity in most developing countries, particularly in Africa.</p> <p>Results will be disseminated, and support as needed will be provided to potential participants to make this an attractive business. Efforts will also be made to improve policy/regulatory climate as needed.</p> <p>Best practice approaches have/will be utilized in designing the action plan, and changes will be made as needed</p>
<p><b>From Components to Outputs</b></p> <p>The RE Fund may not function effectively.</p> <p>Financial institutions and private sector participants may choose not to participate, as increased rural access to electricity and ICTs are risky enterprises.</p> <p>Cost recovery based tariffs with significant regional differentials may prove difficult to implement, since rural people may resent being asked to pay more than urban people for electricity/ICTs.</p> <p>Cross-sectoral links may be difficult to develop or sustain.</p> <p>Timely and effective implementation of RCDF</p>	<p>S</p> <p>M</p> <p>S</p> <p>M</p> <p>M</p>	<p>Clear transparent procedures and accountability has been built into the design of the RE Fund, but it may prove difficult to maintain them because of the risk of politicization. The functioning of the Fund will be reviewed on a regular basis to incorporate any required changes.</p> <p>BOU will take pro-active role in working with financial institutions; a pipeline of sub-projects projects has been prepared, and IFC's entry is likely to give a boost of confidence to the potential participants.</p> <p>Promotional and consensus-building programs will be launched by Government</p> <p>These activities are sought to be made a part of the mainstream work of the various ministries, taking advantage of the foundations already existing within the ministries.</p> <p>UCC will delegate the implementation of IDA-funded subsidies to competent private sector entities.</p>
<p><b>Overall Risk Rating</b></p>	<p>S</p>	<p>The overall rating is Significant in recognition of the fact the overall project design represents a new approach that offers significant prospects for high development impact, but has yet to be field tested. It is recognized that this project will require above-average human and financial resources in supervision, particularly in Phase I. Bilateral donors have already made available significant funds for this project in the form of</p>

		support to the Africa Rural and Renewable Energy Initiative (AFRREI), and it is expected that this support will continue (see Annex 13 for details).
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Risk Rating - H (High Risk), S (Substantial Risk), M (Modest Risk), N (Negligible or Low Risk)

### 3. Possible Controversial Aspects:

**Differential Tariffs** - This program will implement in rural Uganda the cost-based tariff provisions of the Electricity Act of 1999, which replace the former national tariff schedule. As a consequence, tariffs will vary among service providers and are likely to be higher in rural areas compared to urban centers even in light of the investment subsidies provided by the RE Fund. At the same time, the program promises significant expansion in rural electricity access and higher quality service. An awareness campaign is planned which will sensitize the population to this issue within the overall program context. Project sponsors also can avail of social intermediation through the Business-to-Business Support Facility to promote better understanding of this and other issues related to a specific subproject among potential subproject beneficiaries.

## G. Main Conditions

### 1. Effectiveness Condition

- Opening of the Project Accounts for the Ministry of Health and the Private Sector Foundation, and initial deposits of \$50,000 and \$9,000 respectively.
- Adoption of a Project Implementation Plan acceptable to the Bank
- Establishment of financial management and accounting systems and manuals for the Project satisfactory to the Bank (see Annex 6)

### 2. Other [classify according to covenant types used in the Legal Agreements.]

#### Conditions of Board Presentation

- Progress in power sector reform process in line with the plan previously agreed with IDA.
- Legal creation of Rural Electrification (RE) Fund, RE Board, and RE Agency incorporating a governance organization which is consistent with the Government's Rural Electrification Strategy and Plan and is acceptable to the Bank.

#### Condition of Disbursement for UCC, BOU, and PSF Components

- Disbursement on these components is conditional on full execution of the respective Subsidiary Financing Agreements.

#### Condition of Disbursement under the Rural Communications Development Fund Category (DCA Schedule 1 Category 2(a))

- Completion of the ICT bidding documents governing the implementation of the minimum subsidy



- auctions satisfactory to IDA.
- Appointment of the RCDF Board compatible with the Project Implementation Plan.
- Publication of RCDF Manual of Procedures compatible with the Project Implementation Plan.
- Collection of USL Revenues owing up to March 2000.

## **H. Readiness for Implementation**

- ☐ 1. a) The engineering design documents for the first year's activities are complete and ready for the start of project implementation.
- ☐ 1. b) Not applicable.
- ☐ 2. The procurement documents for the first year's activities are complete and ready for the start of project implementation.
- ☒ 3. The Project Implementation Plan has been appraised and found to be realistic and of satisfactory quality.
- ☐ 4. The following items are lacking and are discussed under loan conditions (Section G):

## **I. Compliance with Bank Policies**

- ☒ 1. This project complies with all applicable Bank policies.
- ☐ 2. The following exceptions to Bank policies are recommended for approval. The project complies with all other applicable Bank policies.

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Arun P. Sanghvi  
**Team Leader**

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M. Ananda Covindassamy  
**Sector Manager**

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James W. Adams  
**Country Manager/Director**

**Annex 1: Project Design Summary**  
**UGANDA: Energy for Rural Transformation Project**

<b>Hierarchy of Objectives</b>	<b>Key Performance Indicators</b>	<b>Monitoring &amp; Evaluation</b>	<b>Critical Assumptions</b>
<b>Sector-related CAS Goal:</b> Rural transformation by directly increasing the (i) ability of the poor to raise their incomes, and (ii) quality of life of the poor. <b>GEF</b> Promote renewable energy by removing barriers and reducing implementation costs <b>OP6</b>	<b>Sector Indicators:</b> To be developed in course of PEAP and PRSP report finalization	<b>Sector/ country reports:</b> PEAP, PRSP	<b>(from Goal to Bank Mission)</b> Rural transformation reduce poverty  Renewable energy investments protect the environment by reducing greenhouse gas emissions
<b>Program Purpose:</b> Sustainable development of rural energy and ICT sectors in association with health, agriculture, education, water sectors and SMEs  <b>Program Phasing</b> Phase I: Development of requisite framework and limited investment Phase II: Acceleration/building momentum for investment and advancing capacity building Phase III: Rapid scale-up and consolidation of institution build up	<b>End-of-Program Indicators:</b> Number of homes, enterprises, public institutions (health clinics, schools, water supply facilities), trading centers, and communities with increased access to modern energy/ICTs;  Number of people benefiting from improved delivery of health, education, and water services;  Employment/economic gain due to SME participation in the project;	<b>Program reports:</b> Borrower's Quarterly reports Supervision mission reports  Mid-term review reports  Monitoring and evaluation report utilizing qualitative and participatory approaches  Phase completion reports	<b>(from Purpose to Goal)</b> Availability of modern forms of energy and ICTs facilitates rural transformation.
<b>GEF Operational Program:</b> Remove barriers and reduce implementation costs of renewable energy	Sales of solar pv household and institutional systems;  Price reduction in solar PV product market, improvement	As above	Barrier removal and building local capacity are effective ways of promoting renewable energy

	<p>in product, and increase in the range of product availability;</p> <p>Increase in the power generated from renewable energy sources (excluding large scale hydroelectricity);</p> <p>Increase in local capacity for renewable energy development.</p>		
<p><b>Project Development Objective:</b> (Phase 1 only) Put in place a functioning conducive environment and related capacity for commercially oriented, sustainable service delivery of rural/renewable energy and ICTs.</p> <p>(Phase 1 only) <b>GEF Objective:</b> In addition to Project Development Objective, build in-country capacity for renewable energy.</p>	<p><b>Outcome / Impact Indicators:</b> Private sector investors and investment attracted to rural electrification and renewable energy</p> <p>Benefits in quality of life and non-farm income generation realized by electrified communities</p> <p>Synergistic development linkages with other rural sectors</p>	<p><b>Project reports:</b> Borrower's Quarterly reports Supervision mission reports Mid-term review Phase completion reports</p>	<p><b>(from Objective to Purpose)</b> Development of this framework will make it feasible for private sector to undertake sustainable investments</p> <p>In-country capacity and commercial orientation facilitate barrier removal and cost reduction for renewable energy</p>
<p><b>Output from each Component:</b> <b>1a.</b> Rural connections from main grid</p> <p><b>1b.</b> Renewable energy power generation</p> <p><b>2.</b> Regulatory and institutional framework</p> <p>· Renewable energy capacity</p>	<p><b>Output Indicators:</b> Number of rural households, firms, and institutions connected</p> <p>MW installed; MWh produced</p> <p>Action plan for renewable energy capacity building</p>	<p><b>Project reports:</b> Borrower's Quarterly reports Supervision mission reports Reports from monitoring and evaluation system Mid-term review Phase completion reports</p>	<p><b>(from Outputs to Objective)</b> Regulatory and institutional framework is suitable and works well.</p> <p>Action plan for renewable energy capacity building is realistic and has strong Government commitment</p>

2a. Rural Connection from independent grids	Number of rural households, firms, and institutions, connected	same as above	Initial investments are successful and viewed as such by potential private sector participants
2b. Renewable energy power generation	MW installed; MWh produced		Impact of rural electrification is beneficial and viewed as such by communities
	Number of successful pilots		
3. Households served through solar PV	Economic and social changes Establishment of light-handed regulation, REF Fund, wheeling system and procedures, and a workable intermediation mechanism for commercial financing	same as above	customers satisfied with system price and service dealers develop sustainable networks and practices
4a. Public and Private Sector Capacity Built (Tested business models available for replication)	Number of well-functioning investments Ability of MEMD, REA, PSF to effectively promote sustainable rural electrification	same as above	capacity remains in the sector and is applied effectively
4b. Pilots undertaken and ready for scale-up:	Pilots operational on continuous basis		Pilots demonstrate successful concepts which are ready for scale-up
SME traditional fuels efficiency improvement			
Gasification for thermal and electric applications			
4c. Energy Strategies developed for Education and Water	Energy strategies adopted and put into practice		Strategies properly targeted to maximize energy's contribution to rural education and water supply
<b>Project Components / Sub-components: (Phase 1 only)</b> 1. Main Grid Related Power Distribution & Generation	<b>Inputs: (budget for each component)</b> \$20.8 IDA \$4.6 GEF	<b>Project reports:</b> Borrower's Quarterly reports Supervision mission reports	<b>(from Components to Outputs)</b> Regulation and RE Fund are operational.

		Disbursement reports	Sufficient number of project sponsors participate.
		Audit reports	Local bank(s) willing to provide debt finance.
2. Independent Grid Systems	\$6.5 IDA \$1.0 GEF	As for main grid	Acceptable tariff policies.
3. Solar PV Systems, household only	\$0.0 IDA \$1.4 GEF	As for main grid	As for main grid
4. Cross Sectoral, including solar pv institutional systems	\$7.6 IDA \$0.0 GEF	As for main grid	Private sectors dealers willing and able to participate.
5. Energy sector capacity building, technical assistance, training	\$8.7 IDA \$5.12 GEF	As for main grid	Households are willing/able to pay.
6. ICT investments and technical assistance	\$5.5 IDA \$0.0 GEF	As for main grid	Priority needs of institutions have been properly identified.
Total	\$49.15 IDA \$12.12 GEF		Health, education, water ministries are willing and able to include energy/ICT systems in their mainstream functions.
			Capacity building plans are realistic.
			Private Sector Foundation works effectively
			Timely implementation of RCDF and specification of unserved sub-counties.
			Sufficient private sector interest.
			Pilot telecenters attract sufficient community interest to be financially viable

## Annex 2: Detailed Project Description

### UGANDA: Energy for Rural Transformation Project

#### By Component:

##### Project Component 1 - US\$45.55 million

#### Main Grid related power Distribution & Generation

This component will be implemented by the private sector. The project will finance investments in selected sub-projects, initially directly via a refinancing agreement, and later through a Credit Support Facility that will be developed during the course of project implementation. The project will also provide GEF grants for qualifying renewable energy investments.

The *power distribution* would be to presently unserved rural areas that would be connected to the main grid, with the power supply to come predominantly from the large-scale hydropower plants. It is expected that the private sector distribution concession areas arising from sector restructuring would be narrowly defined in terms of the physical distance from the existing grid. Thus, the extension of the main grid beyond these narrow boundaries to rural areas would be supported under this component.

The generation of power supported under this component would be *from small, renewable energy resources*, such as sugar mills, that are close, or already connected, to the main grid.

The bulk of the specific sub-projects to be supported under this component will be developed during the course of the project. Two examples are presented below, one for renewable energy power generation, and the other for main grid extension and local generation, which has been developed by IFC and is being supported in this project.

#### **Example: Kakira Sugar Works (KSW) cogeneration project**

The overall approach to the Kakira grid supply electricity project contains a multi-faceted implementation plan to be implemented in parallel with a sugar mill capacity expansion. The project design responds to both short-term energy shortages and longer-term capability to contribute in a competitive marketplace. The project will bring tangible associated economic and environmental benefits to the country. Sugar imports will be reduced or eliminated, the electricity shortage will end earlier than otherwise can happen, the country's emission of greenhouse gases (GHG) will be reduced, and the local watershed environment will be significantly improved. The project will have a definite positive financial and economic impact also on farm and non-farm incomes and contribute greatly to the country's poverty eradication efforts.

**Project size and cost.** The planned Kakira cogeneration project has undergone several iterations in project size, based on the technical potential as well as the willingness of the main grid to purchase excess power. The final configuration of the project calls for an expansion of capacity by 14 MW, of which a maximum of 7 MW will be dedicated to grid supply during 6 peak hours per day, and about 3 MW will replace existing generation capacity, which may be retained on a stand-by basis. The total estimated capital cost for this project, based on a low pressure boiler, is about US\$14 million, including interconnection to the main grid; final hardware and services quotations are being obtained to confirm this estimate.

The sugar mill would increase its cane processing from 3,000 to 4,000 tons per day, which will allow it to utilize all of the Kakira surplus bagasse; currently Kakira burns in open fields up to 200 tons per day of surplus bagasse.

A second phase project could be commissioned at the Kakira Sugar Mill as early as three years after the commissioning of the first phase power system. The second phase could consist of the installation of new high pressure, high efficiency, condensing/extraction steam turbine generator capacity along with the necessary boiler capacity and auxiliaries. The ultimate electricity capacity that would be available from the Kakira Sugar Mill will depend on both the electricity market conditions and the ability of Kakira to further expand sugar cane growth and further increase cane processing capacity to as much as 6,000 tons cane per day. At this time it is estimated that a second phase project at the Kakira Sugar Mill could result in as much as 35 – 40 MW total capacity with up to 20 – 25 MW availability for full-time grid supply.

**Power purchase agreement.** To enable structuring of a financing package for the project that includes a commercial finance component, it will be necessary to have an equitable Power Purchase Agreement (PPA) signed with the main grid operator. In a meeting chaired by the Minister of Energy, the Government, Uganda Electricity Transmission Company and Uganda Electricity Distribution Company, and the promoters have reached an understanding about the terms of the long-term PPA for this project. It is expected that a PPA based on this will be signed as soon as possible.

### **Example: Bushenyi and Rukungiri Rural Electrification Project (IFC-sponsored)**

IFC has identified and developed a commercially viable - with capital costs subsidies - power generation and distribution project in the predominantly rural districts of Rukungiri and Bushenyi in southwestern Uganda. Industrial Promotion Services (IPS) of Uganda, a Ugandan conglomerate which is part of the Aga Khan Fund for Economic Development (AKFED) family, is the lead sponsor for this project.

The projects will provide electricity to residential, commercial, institutional, and small industrial clients in Bushenyi and Rukungiri via 33 kV sub-transmission networks. The project also includes a small generation plant (run-of-the river 5MW hydro) project at Ishasha which will serve both Rukungiri and Bushenyi. The cost of the distribution network for Bushenyi and Rukungiri, and the generation plant at Ishasha, is expected to be about \$14.5 million.

In Bushenyi, the initial number of connections are expected to be about 2,500, of which 1,600 are expected to be residential. In Rukungiri, the initial number of connections are expected to be about 2,600, of which 2,000 are expected to be residential (or 5,100 initial total connections). It is expected that the residential connections will increase by between 8-10% per year, whereas commercial will increase by about 4% per year.

In order to keep tariffs affordable (\$0.085/kwh for residential, \$0.12/kwh for commercial), there is a need for (i) adequate offtake arrangements for selling excess power to UEB, and (ii) capital cost subsidies of 45-50% of project cost, or between \$6.5-\$7.25 million; apart from the GEF incremental cost grant of \$ 1.3 million, the remainder would be from the RE Fund and/or bilateral donors. The remainder of the project cost, \$7.25-8million will be funded through equity and senior loans. Further, debt finance on commercial terms of about \$2-4 million is needed from local banks, with refinancing from IDA resources.

On September 1, 2000, the Government of Uganda, IFC and IPS signed a memorandum of understanding agreeing on the modus operandi for developing the project. IPS has since established the Uganda Rural Electrification Company Limited (URECL) in which IFC will have equity participation. The US-based National Rural Electric Cooperatives Association (NRECA) have been technical consultants to IFC, IPS and now URECL for developing this project.

URECL is the first company of its kind in East Africa with its focus on developing and operating rural electrification projects. It has completed a detailed appraisal and business plan for developing a 5 MW run-of-river hydroelectric site on Ishasha river in Rukungiri and distribution grids starting with a total of 5,000 connections to currently unserved consumers in Rukungiri and Bushenyi. A financing package is currently being developed by the project sponsors. The Kayonza Growers Tea Factory, the largest consumer of energy in Rukungiri, has already agreed to provide equity participation in the project while major consumers of energy in Bushenyi are being approached for similar participation.

The Electricity Regulatory Authority (ERA) of Uganda gazetted this project on February 12, 2001, as a notice requesting comments from the public over a 30-day period, and has commenced its deliberations on the license for this project.

### **Project Component 2 - US\$26.13 million**

#### **Independent grid systems**

This component will be implemented by the private sector. The project will finance investments in selected sub-projects, initially directly via a refinancing arrangement and later through a Credit Support Facility that will be developed during the course of project implementation. The project will also provide GEF grants for qualifying renewable energy investments.

In relatively concentrated but remote settlements with a potential for the use of electricity by rural enterprises, this component would support independent grid systems that may require some transmission (such as in the West Nile region) as well as smaller systems, such as those located in rural trading centers that require only generation and distribution facilities. It is expected that a significant part of the power generation would be from renewable energy resources.

Two of the sub-projects to be supported under this component have been identified during project preparation and are described below; other sub-projects will be developed during the course of the project implementation.

#### **Example West Nile electrification project**

The West Nile Region comprises of the districts of Nebbi, Arua, Moyo and Adjumani. Currently the Municipalities of Paidha (estimated population 20,000), Nebbi (estimated population 10,000) and Arua (estimated population 50,000) are supplied by the Uganda Electricity Board (UEB) through isolated diesel stations in the region, one serving Nebbi and Paidha and the other supplying Arua

Each municipality is served by an old, fragile distribution system, with Nebbi and Paidha connected by a 33 kV transmission line (constructed originally for the Paidha scheme). All three municipal areas receive a maximum of four hours electricity every night (from 7.00 p.m. to 11.00 p.m.).

The West Nile Region has the potential to be one of Uganda's more productive agricultural areas. Prior to 1979, it was one of the country's most developed areas; it is now rapidly recovering from decades of turmoil and neglect. It has several agro-ecological zones, ranging from dry -land Savannah to highland tea and coffee zones. Historically coffee, tea, tobacco, cotton, ground-nuts and sesame were the most important cash crops; at present, coffee and tobacco production are up.

Arua Municipality, served today by less than 700 kW of unreliable UEB diesel electricity, is the largest



town in Uganda not connected to the main grid. The lack of adequate and reliable electricity supply has seriously constrained the region's development, particularly in the agro-processing fields like coffee, cotton, tea, and grain milling.

## **Demand for electricity**

Surveys were undertaken of some 900 businesses, institutions and households in the West Nile during August and September 2000 to determine levels of demand, use of non-UEB electricity and power sources to meet demand, and key economic and financial performance indicators. The study showed that UEB is currently supplying 776 kW for four hours per night, from three generating sets (gensets), accounting for 53 MWh supply to some 845 customers per month. UEB's load factor is on the order of 60%, and it sheds at least 400 kW of load on its network each day of operation (it only operates four hours per night, between 1900 and 2300 hours).

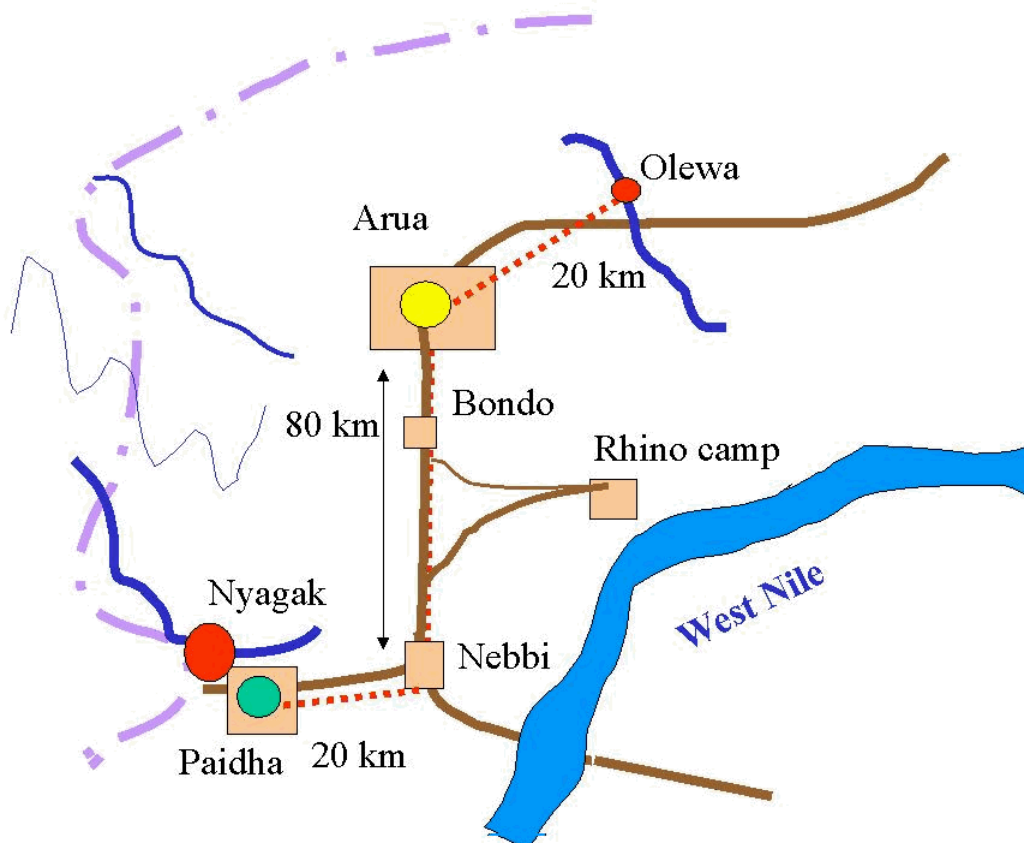
Due to this low level and poor reliability of supply, many West Nile businesses, institutions and households have invested significant amounts in private diesel and petrol (gasoline) generation and diesel milling engines over the past several years. Some 183 private diesel and petrol gensets are owned by individuals, institutions and businesses, accounting for over 2.37 MW of installed private capacity run on very inefficient lines accounting for over 4 GWh (gigawatt hours) generation per annum in the three towns of Arua, Nebbi and Paidha. Additionally, 42 diesel engines, accounting for some 492 kW of supply generate an estimated 800 MWh per annum in the three towns.

## **Electrification license**

The West Nile electrification project will be the first integrated power utility license concession to be granted to a private investor in Uganda under the Power Sector Restructuring and Privatization Strategy (PSRPS) in which the government is unbundling the Uganda Electricity Board into transmission and generation businesses. This will start initially with the electrification of Arua and Nebbi Districts, where the national state owned Power Company, UEB, owns and operates two small grids supplied by diesel generators. The proposed project will consist of **2.5 MW of diesel generation** and **7.6 MW of hydropower generation** from two mini-hydro power plants in the West Nile Region, with **cumulative sales** of approximately 706 GWh (gigawatt hours) over the twenty year life of the project (2001 to 2020),

The scheme consists of:

- the sale of the Uganda Electricity Board's (UEB) generation and distribution assets in Arua and Nebbi Districts of West Nile,
- the construction of an 80 km (approximately) sub-transmission line between the town of Nebbi and the town of Arua, to be paid for by the Government of Uganda
- the installation of two new efficient diesels (1 by 1.5 MW and 1 by 1.0 MW) as both base load during the construction of the Nyagak (Nebbi District) hydropower plant (HPP), and later as peaking plant;
- the construction during Phase I of the ERT of a 5.1 MW HPP at the Nyagak site in Nebbi District, and, two years later, the construction of a 1.5 MW plant in Olewa, Arua District;
- the upgrading and extension of the existing distribution networks in Paidha and Nebbi municipalities (in Nebbi District) and Arua municipality (Arua District), the largest load center in the West Nile Region.



***Schematic representation of the West Nile electrification project***

The area has considerable small hydropower capacity. At least 10 MW of capacity can be relatively inexpensively tapped using run-of-river technologies (i.e., no storage required) and nearly 7 MW of that is within easy distance of these three urban areas. Developing two prime sites, Nyagak in Nebbi District near Paidha, and Olewa in Arua District near Arua town, has been carefully examined by the Government of Uganda, the USTDA, the Dutch Government and others over the past decade and shown to be technically and commercially feasible. Recent studies carried out by the Dutch and the project team have shown that demand and ability to pay warrant commercial development of at least these two sites. Demand studies show that the current UEB customer base could be easily doubled, and load of some 7 MW served within a seven year period.

It is on this basis that the Government of Uganda is putting out a concession for a build, own and operate vertically integrated utility for the West Nile. The Prototype Carbon Fund is very interested in the West Nile hydropower scheme with its high potential for displacing considerable amounts of fossil fuel (equivalent to well over 150,000 tonnes of carbon over a 20 year period), and has had extensive discussion with the Government regarding an "emissions reductions purchase agreement."

Work carried out in preparing the project shows that current private generator consumers (over 220 of them) pay more than US\$0.65 per kilowatt for electricity. The preliminary estimates are that an economic return on equity of nearly 20% could be generated by an average tariff on the hydropower system of between US\$0.15 and US\$0.20. This is well within the boundaries of several thousand residential, commercial and institutional customers' ability and willingness to pay, and compares very favorably with a projected tariff of some US\$0.10 on the main grid by the year 2003.

A West Nile Concession Document and Bid package has been prepared and is now being reviewed by the Electricity Regulatory Authority and MEMD for review. An August 2000 Request for Expressions of Interest (EOI) produced six EOIs (2 Ugandan, 1 Kenyan, 2 South African, and 1 Swiss) indicating credible interest in the project.

**Example. Kisiizi micro-hydro electrification project**

Kisiizi Hospital, founded in 1958, is a Church of Uganda (COU) health care centre situated in the mountains of North Kigezi, Rukungiri District in south-western Uganda. Kisiizi Hospital is one of Uganda's most important rural health centres, and serves a catchment area comprised of much of south-western Uganda, with a service population of some 150,000 people. The Hospital has 7 doctors, 45 qualified nurses and 6 clinical officers (paramedics), with a total of 240 staff (170 permanent). It serves 150,000 people directly, but operates on referrals from many more. Hospital costs are covered 35% from donations (primarily international), 15% from the GOU and 50% from "user fees." Apart from the main hospital (200 beds), there is a primary school, a training centre, a rehabilitation centre for the physically handicapped, an orphanage, an eye ward, a guest house and staff houses.

Kisiizi Hospital and the associated complex is supplied with electricity from a 60 kW micro hydro power plant. The Hospital's micro-hydropower plant was designed to meet the requirements of the hospital and to supply staff members on site. Over the years demand from both the hospital complex and from staff has increased to the point that for several years the Hospital has been forced to ration supply, thereby limiting the load on the hydropower facility as a number of energy-intensive activities take place on the Hospital's grounds including a maize grinding mill, a welding garage, a carpentry shop, autoclaves, x-ray machine, hospital and staff house electric water heaters, and security lighting.. For several years no electric cooking or other nonessential heavy electricity demand have been allowed on the system, except off-peak. Were more electricity available, the Hospital could employ existing equipment better, could use new equipment and could provide staff with more electricity.



***Kisiizi hospital, situated deep in the south western mountains of Uganda, can expand its micro-hydro power generation capacity to serve the nearby community and meet its own increasing demand for electricity.***

## **Proposed Business Set Up**

Kisiizi Hospital is one of Uganda's most important rural health centres, and is clearly one of the region's most essential social assets. It operates a unique rural health insurance scheme with some 9,000 policy holders. Furthermore, the Hospital would like to supply electricity to its neighbors. The population around the hospital is without electricity, and depends on kerosene for lighting, and dry cells and car batteries for radio/cassette and television. The area has very poor communications, and there is growing demand for linking this thriving community to Uganda's rapidly expanding telecommunications network. The Hospital recognizes that the absence of electricity and telecommunications in the surrounding community is impeding development and the delivery of social services.

It was with these factors in mind (need to increase supplies to the Hospital itself, desire to supply neighbors) that Kisiizi Hospital undertook a feasibility study to determine the potential for increasing power supplies from the river, and to determine the costs for doing so. The project team has been working with the Hospital and local communities since June 1999 to develop a scheme that would meet these objectives. The Team has worked with the Hospital to design an extension to the existing hydropower plant, to develop the structure for a vertically integrated electricity supply company supplying both the Hospital and the community, and to develop state-of-the-art ICT services for the hospital and local community.

Based upon this work, Kisiizi Hospital has developed a structure for setting up an electricity supply company (call it Kisiizi Hydropower Project - KHPP) that will supply the hospital, and initially, some 600 residential, institutional and business customers. It has proposed to its Board an operating structure that will take the form of a private company limited by guarantee. Under Ugandan law, a company "limited by guarantee" is a private company whose objectives are "of a social and developmental nature", where surpluses are ploughed into designated social and development activities. Effectively a company registered in this way is treated legally in the same way as a limited liability company; it cannot declare a profit, and is taxed accordingly. KHPP will have the primary purpose of building, owning and operating a hydropower facility that will comprise the existing 60 kW dam and turbine, and an additional 150 kW hydropower extension (civil works and generation), a grid network extending up to 2 km from the hydropower plant, and backup diesel generation. KHPP will generate approximately 210 kW of hydropower (150 kW additional to present supply). It will sell electricity to the Kisiizi Hospital (as its major customer), and over 600 consumers at commercial rates.

The KHPP will be granted supply and distribution (sales) licenses by Uganda's new Electricity Regulatory Authority (ERA). The KHPP will employ a managing director, a financial director and several technicians. Shares in the KHPP will be 51% (or more) owned by the Kisiizi Hospital, with the remaining shares owned by the Diocese of North Kigezi. The KHPP Board of Directors will be drawn from both the Hospital and the Diocese. The Company will sell electricity on a differential tariff, cost recovery basis that will include an operating surplus that will be used by the Hospital to expand and improve its services to the community. The financial plan shows that such sales will account for a substantial source of revenue for the Hospital in the future. This should enable it to expand its services in such key areas as HIV/AIDS care and prevention, mother-child health (MCH), extending its vaccination program (EPI), improving staff remuneration, extending health coverage to a wider number of beneficiaries, among other objectives.

Kisiizi Hospital offers an excellent model for Uganda for rural electrification. It offers the opportunity to demonstrate that other health and social centres (e.g., boarding schools, technical schools, local authorities, etc.) can develop rural electrification projects that not only provide electricity to themselves and their neighbors, but which earn revenues to promote social and economic development. This is a crucial element

of the Government of Uganda's rural electrification strategy, and is a major focus of the ERT program.

### **Electricity Demand**

The ERT project team commissioned a local team to work with the Hospital to develop a business plan. Demand and consumer surveys were undertaken, and technical and business plans were drawn up. Technical specifications were drawn up by local and international specialists. The demand surveys showed that current peak power demand at present is around 170 kW. This comprises the service area made up of the Hospital, Kisizi Town, the market area and the Kihanga area. It is estimated that during the first two years of operation, Kisiizi Hospital (the Hospital complex) will account for between 55-60% of peak load, and a higher proportion of base load.

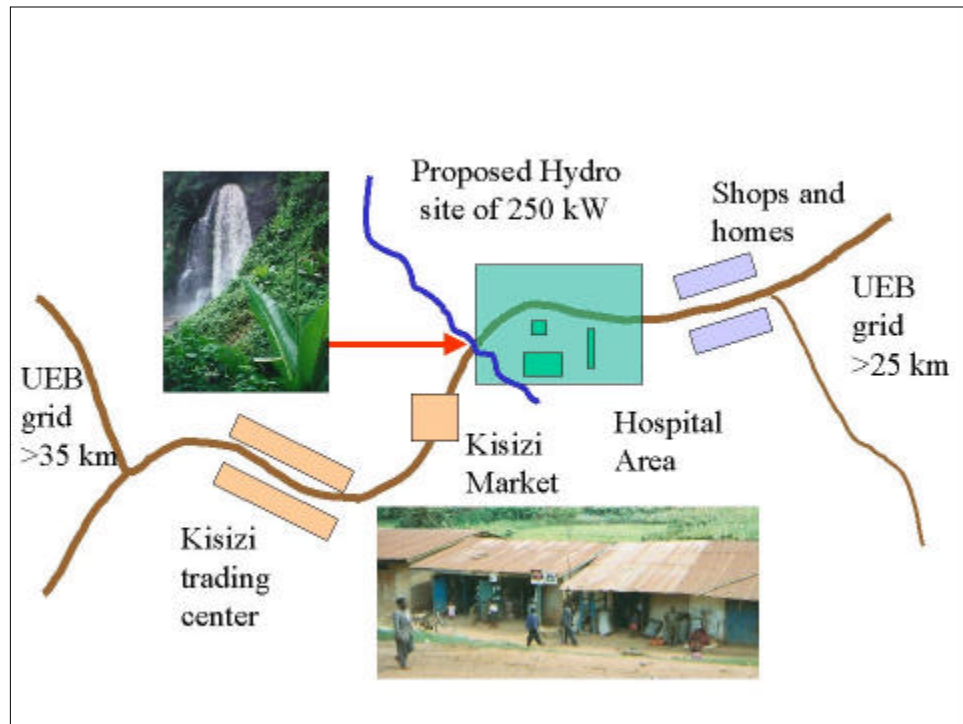
The KHPP is fortunate to have such a large, dependable load with the hospital. As a new company, it will begin its operations with that heavy, steady load (and a good paying customer) from Day 1. This is good both from a technical operational sense, as well as from a financial perspective. The Hospital will benefit in two ways. It will be able to increase its electricity consumption to provide a wider range of services within the Hospital complex. Secondly, it will earn (from its shareholding in the KHPP) substantial revenues to expand its service offerings and operations in the region. Revenues from the KHPP will help to reduce patient fees, on the one hand, and will make the Hospital much more autonomous (less dependent on outside donations) than at present.

**Table 1: KHPP Customer Profile (2001)**

<b>Customer Category</b>	<b>Number</b>
<b>Households</b>	400
<b>Small businesses</b>	194
<b>Light industry</b>	14
<b>Institutions</b>	
Hospital	1
Others (schools, churches etc.)	9
<b>Total Customers</b>	<b>618</b>

### **Technical Specifications**

Various options have been studied regarding the power supply options for the Hospital. These include connecting to the main grid, some 29 km away, to expanding the hydropower facility to supply local MV/LV (medium voltage/low voltage) networks, or LV networks only. Options for generation (cross-flow turbines versus Francis turbines, etc.) have been explored and costed.



***Schematic representation of the Kisiizi electrification project***

The Hospital has chosen to expand the civil works and increase power supply through the installation of a 150 kW crossflow turbine. A low cost network has been designed for the KHPP which will initially provide electricity to the nearby town, trading centre and a part of the Kihanga area restricted to a maximum distance of 2 km from the power generation site. The low-cost design includes a distribution network, an intermediate voltage distribution (1-2 kV) and street-lighting. Drop-wires, ready boards and pre-payment meters are proposed. Most of the system will be developed as single-phase spurs. The cost for the local network (MV/LV), including customer connections and pre-payment meters, is approximately US\$ 150,000, resulting in an average cost per connection of US\$ 300, a third the cost currently of a UEB (Uganda Electricity Board) connection on the main grid.

A business and operations plan has been developed for the KHPP that comprises:

- Formation of a company limited by guarantee, that will serve as an ESCO (Energy Service & Supply Company) supplying the Hospital itself, and a vertically integrated electricity utility supplying the surrounding community. The operations of the KHPP will be totally separated from those of the Hospital. The KHPP will have its own board of directors (representing the Hospital and the Diocese of North Kigezi), its own accounts, its own clients, and its own staff.
- A network comprised of both medium and low voltage (MV/LV) distribution, that will supply productive businesses (e.g., mills, carpentry shops, welding shops, etc.), commercial establishment (e.g., shops, kiosks, service centres), and households within an initial radius of 2 km from the hospital. The distribution system will be upgradable with the potential to connect to the main UEB grid via single-phase connections when the grid expands into the area;
- An Information and Telecommunication Center (ITC) will also be established at the Hospital. This will enable essential communications for the Hospital itself (e.g., essential telecommunications,



tele-medicine, medical consultations, etc.) and will support the community with information and communication services at affordable rates. The ITC will initially be equipped with telephone, telefax, PC with Internet (Web and e-mail) connection as well as a photo-copier. (For more information on the Kisiizi ICT, see section 6 of this annex)

### **Project Component 3 - US\$ 10.80 million**

#### **Solar PV systems**

This component will be implemented by private pv companies who would market, sell and install pv products and provide after sales services. The project will provide GEF grants for the installation of solar pv systems in homes, public health, educational and water institutions (component 4), and rural enterprises for relatively dispersed areas that have small loads where even small independent grid systems are not viable. In addition, technical assistance would be provided for business development and support services, often on a cost-share basis, under the auspices of the Private Sector Foundation through an agreement with the Ministry of Finance (component 5).



***There is a small base of private sector solar pv sales, but growth is being stalled by a vicious circle of low sales volume, very high prices, and weak distribution networks.***

**Eligibility criteria for companies to receive GEF grants.** Grants will be available for confirmed sales (including leases, fee-for-service arrangements, hire purchase and other commercial transactions). In order to receive grants, a company must initially meet, and continue to meet, the following criteria:

- (a) have operations that include sales of PV systems;
- (b) prepare a business plan acceptable to the Bank and to a participating financial organization that demonstrates that:
  - the PV systems sold would meet the Project's technical specifications;
  - the company's operations would be commercially viable;
  - the company has made arrangements to grow its pv sales;
  - the company would abide by adequate consumer protection plans, including warranties and adequate after-sales services; and
  - the company has a system to provide data required for project monitoring. The company would retain documentation for the full period of the warranty of each PV module sold.
- (c) abide by a satisfactory competitive code of norms for dealing with customers, employees, and other companies, including providing customers with complete and correct information about products, services and prices and not engaging in actions that might prevent competitors from entering or operating in particular market areas.

**Products eligible for GEF grant.** Products eligible for GEF grants as SHS would consist of a pv module, battery, a charge controller and, if lights are provided, at least one light that meets specifications. The minimum pv module size would be 10 Wp capable of providing two to three hours of lighting. These would include solar lanterns. Institutional systems, for example pv systems for health clinics, schools and telecommunications centers, as well as other systems which are not for household electricity, for example systems for water pumping or for solar panels in hybrid systems (e.g., with wind or diesel), would also be eligible for grants.

**Grant levels.** These are specified in Annex 11.

**Technical specifications.** Uganda is currently developing a specification for an SHS through a participatory process, in consultation with local companies and PV-GAP. After satisfactory review of the proposed specifications by the Bank, systems based on components that are certified by acceptable testing institutions as meeting the specifications will be eligible for GEF grants. Also, products that meet the pv specifications established for the Bank's projects in Sri Lanka (ESD), Indonesia (SHS) and the China Renewable Energy Development Project will be eligible for GEF grant payments. The technical specifications include minimum warranties. In addition, companies participating in the program would be required to meet acceptable after sales service standards. Copies of these specifications are included in the PIP.

For the institutional systems and other pv applications, the acceptability of the design specifications and components would be determined by case basis by specialists acceptable to the Bank. In the case of institutional systems, these normally involve bilateral donor support, with the specifications being developed during the preparation of a broader sectoral project or program in which energy supply is a supporting element.

**Compliance monitoring** There would be a facility set up through a contract with the Ministry of Finance to ensure that grant funds are correctly used. This facility could be arranged through the PSF, with the PSF contracting an NGO to take an independent lead in this area.



A strong, independent end user audit and compliance monitoring capability is a key requirement for ensuring proper use of funds and maintaining private sector confidence in competitive market development. This facility would be responsible for:

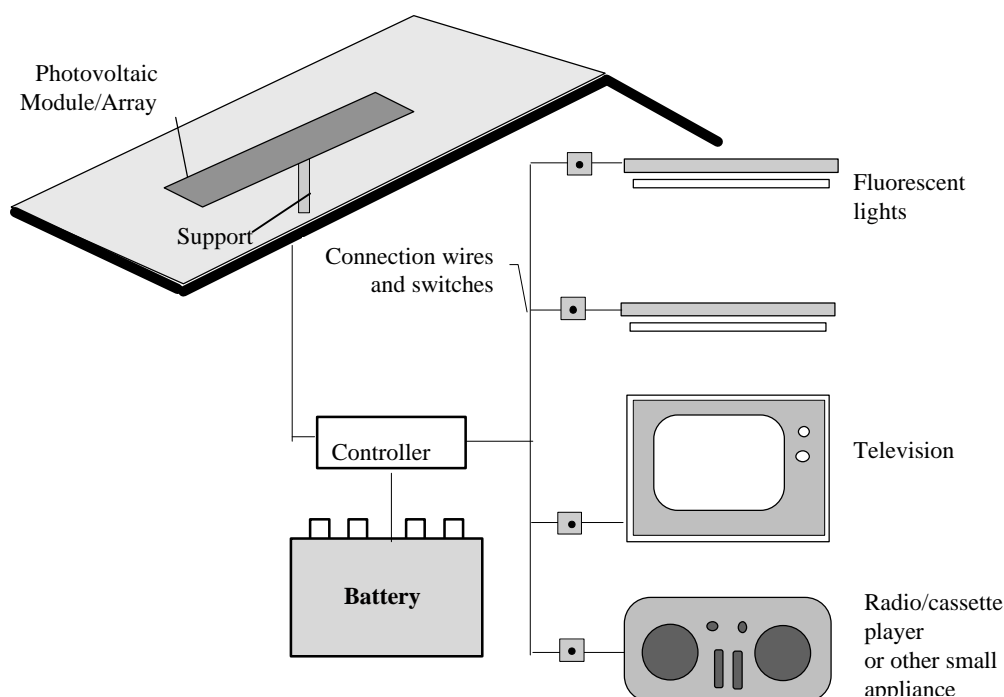
- Due diligence on business and market plans submitted to commercial banks. The GEF grant fund will be in special account at MOF/BOU but disbursed on applications received from participating financial organizations on behalf of participating companies. Acceptance of companies into the program will follow a vetting/clearance by an organization contracted by the MOF
- End-user audits, sign-off to MOF on payment of GEF grants for pv sales and complaint based and other compliance monitoring. The first 25 SHS sales of a company would be confirmed as meeting specifications prior to the processing of an initial grant payment request from a participating company.

**Grant disbursement.** The grants would be channeled through **participating financial organizations**, which will enter into agreements with the Ministry of Finance/Bank of Uganda.

Companies wishing to participate would apply to a PFO, providing it with a satisfactory business plan (see below) and other documentation required by the PFO. There would be no obligation for the company to borrow from the PFO in order to enter the program, but it is anticipated that growth of sales would at some point require the company to have access to credit from the PFO. Once a PFO has determined that the business plans is satisfactory and that the company is an acceptable client, the PFO may submit a request to the Bank that the company be accepted to participate in the program.

## **Background**

A typical SHS consists of a pv module, a battery, a means to control battery charge/discharge, fluorescent light(s) and related components such as wiring, switches and mounting hardware (Figure below). The amount of electricity produced is directly proportional to the intensity and duration of sunlight falling on the module and on the size of the module surface area. Typically modules are rated by the amount of power (watts) generated when sunlight equivalent to noon-day sun strikes its surface and the output is given as Peak Watts (Wp). Modules can be combined into arrays to give more power. For example, two 50 Wp modules can be combined to give 100 Wp of power.



## Market status and trends

The potential for PV development in Uganda for rural electrification for households, communities and businesses, is largely untapped. Photovoltaic system sales are low, prices high, and technical capacities are limited. There is considerable scope for a rapid scale up; the ongoing UNDP/GEF- supported Uganda Pilot Project for Rural Electrification has already taken the first steps to strengthen the capabilities and support the efforts of the existing Ugandan PV companies.

The key characteristics of the market are:

- The total pv market sales for 2000 in Uganda are estimated to about US\$ 1.1 million for 54 kWp of solar panel capacity (Table 3.1); annual sales in Ugandan shillings (unadjusted for inflation) have increased by about 15% - 20% per year over 1997 – 2000. The sales are on cash or invoice basis, i.e., no credit sales.
- The market is mainly institutional, often donor supported. Most systems sold, an estimated 65%, are of small systems of less than 60 Wp but the sales of larger systems account for 65 - 70% of total sales revenue (Table 3.2). There are reportedly several thousand household systems installed.
- Panels, predominantly crystalline, are imported. Most Balance-of-System components are also imported; local batteries have not been adapted for the PV or TV market, though there is a very limited local production of lights and controllers.

**Table 3.1: Estimated pv sales, 2000, by system size**

	Units	Average Wp	Total Wp	Estimated \$/Wp	Estimated Revenue (US\$)
12-60 Wp PV systems	450	40	18,000	20	360,000
60-240 Wp PV systems	150	100	15,000	21	315,000
> 240 Wp PV systems	15	300	4,500	21	94,500
Water Pumping	15	800	12,000	20	240,000
Refrigerators PV systems	20	200	4,000	22	88,000
Portable Lantern, others	25	20	500	23	11,500
<b>Total</b>	<b>675</b>		<b>54,000</b>		<b>1,100,000</b>

**Table 3.2: Estimated pv sales, 2000 by consumer segment**

Customer segment	Uses	Units	Total Wp	Estimated Revenue US\$
shs private	House lighting, radio, tv, computers, phones, shop and clinic lighting	400	18,000	360,000
NGOs	Lighting, radios, phones, computers for offices and housing	100	10,000	210,000
official / donor market	Health clinics lighting and refrigerators, staff, office and school lighting and equipment	100	20,000	420,000
Other	Telecommunications, signaling, security radios	75	6,000	110,000
<b>Total</b>		<b>675</b>	<b>54,000</b>	<b>1,100,000</b>

### ***Characteristics of consumer segments***

The key characteristics of the different segments are:

- **Private SHS segment**, including households, small shops and private rural clinics
  - Products are mainly small to medium PV systems for house lighting and appliances, especially radio/cassette players and televisions. Medium and larger size systems are custom designed to suit individual requirements. The potential consumers in this segment currently rely on kerosene wick lamps, dry cells for torches and radios, and battery operated tvs. Some use diesel gensets.
  - Accounts for about two-thirds of unit sales. Sales are on a cash basis, or in some cases on an invoice basis for well established individuals. Customers buy directly from companies or agents.
  - Affordability tends to be seasonal, depending on crop harvesting or livestock sales, with sales peaking during the harvest season. Some purchasers are individuals or small firms

operating shops or clinics in rural areas, whose main needs are lighting and radio and, in some cases operation of computers and charging of cellular phones. A main group is salaried workers and business people in towns who buy systems for rural homes, with sales often following monthly payment of salaries. Lowest sales are during the beginning of school terms.

- This segment is price sensitive, while also conscious of product robustness. It favors known brands and firms.
- **NGO segment**, including churches and local schools
  - International NGOs, often in link with local ones, buy solar pv systems for domestic and office lighting, computers and other office equipment, telephones, water pumping, radio, and tvs. The products cover the full range of sizes.
  - Sales are dependent on NGOs' budgets, which in turn are often dependent on donor programs. This segment buys directly from the companies (i.e., almost never from agents) and the market is accessible through advertising, personal contacts and public relations.
  - Buyers in this segment are concerned about robustness and environmental impact, and often willing to pay a premium for quality products and service.
  - This segment includes local churches and community schools that purchase pv for lighting and radio/tv, usually with funds controlled by church or community committees. This group is very price sensitive, and is usually communicated with through direct personal contacts. Members of the Church of Uganda have been an important group in the market, with sales facilitated by charity funds from the US.
- **Official and donor projects segment**, including health centers, schools, rural administration
  - The products are medium to large solar systems, with sales dependent on official and donor programs budgets
  - Buyers in this segment are constrained by official or donor procurement procedures. After sales service, maintenance and long-term system reliability are reported concerns. Buyers are concerned about robustness and environmental impact, and often willing to pay a premium for quality products and service
- **Other customer segments**
  - Some systems are brought in privately and quietly, or directly imported and installed by donors, companies and NGOs.

### ***Characteristics of solar pv suppliers***

Overall, the supply market is reasonably competitive, given its small scale. At present, four companies have an estimated 80% of total sales, with one of the companies having an estimated 35 - 40% of total sales revenue; six other companies have some pv sales, and there are a few sales by traders selling pv products off-the-shelf along with other consumer items.

Two of the larger four companies deal exclusively in solar pv sales and installations, while the other two larger firms cover a wider range of products, mainly energy related. Three companies are strong in the domestic segment, all four larger companies are competitive in the official/donor and NGO segments, though one company is dominant in the church linked group. All four larger companies have basic

capabilities to size, assemble and install solar pv systems suitable to an individual consumer's need/order.

### ***Supply and marketing / distribution channels***

International companies, mainly American, European and Japanese, sell to Ugandan agents, often through Nairobi based offices. One Uganda company assembles/manufactures some lights, controllers and inverters at a small enterprise level. There is a local battery manufacturer, but the market reputation is that quality is poor, they have not adapted their batteries for pv systems or tv operation and most batteries sold with pv systems are imported.

Most of the sales are to the domestic SHS segment, and the main distribution channel is direct purchases from the Kampala offices of the four larger companies. The second main distribution channel is responses of the main offices to official/donor/ NGO requests for proposals or price quotes. There have been 4 - 7 procurements per year, most for less than \$50,000, although several for considerably more, by government and international NGO, usually with donor financing. Often bids are prepared by international firms, with the Ugandan company as the local partner responsible for installation and after sales service.

Distribution networks in rural areas are extremely sparse. There are five branch outlets and several agents in secondary towns; these are recently established, not well stocked with inventory and sales are low. Sales through the Church of Uganda network use church facilities for distribution.

### ***Products and prices***

The main products and recent price ranges in the Uganda market are:

- most panels are crystalline
- lighting and small solar power kits (SHS) for domestic, office, school and clinic use, off the shelf and custom designed, price \$400 - \$1,250
- small portable lamps or lanterns, off the shelf, price \$100 - 225
- water pumping systems - usually through orders, \$8,000 - 10,000
- vaccine refrigerators - through orders, \$4,000 - 10,000

The prices of products of all sizes for the domestic market segment are two to three times higher than the higher quality Chinese and Indonesian products. For example, a 50 Wp system installed in a remote location in Indonesia costs \$400, while a similar system installed in Uganda has a price of more than \$1,000. Similarly, 8 Wp system in remote locations in China sell for \$140, while a 20 Wp system in Uganda has a price of \$450.

The prices of pv products in Uganda have been 50% higher than in Kenya. This price differential is tending to narrow as Indonesian components (whose development was spurred by the ongoing Bank-GEF Indonesia Solar Home Systems Project) enter the Uganda market.

The quality of the off-the-shelf products in the domestic market segments is lower than those in the Chinese and Indonesian markets, while the custom designed systems are generally of good quality. Consumer choice is limited, and companies carry few products in stock.

## ***Trends***

Awareness of pv products is increasing. This reflects gains from the advertising and public relations by the main companies and activities of the UNDP/GEF pilot solar program. While the increased awareness - confirmed by the various pv companies - has not as yet led to a measurable increase in sales and commercial activity, it has increased the companies' confidence that the market will grow. This is reflected in the increasing direct efforts of the main companies, in some cases with support assistance provided by the UNDP/GEF pilot project.

While crystalline modules continue to dominate, amorphous silicon (a-Si) modules are entering the market more strongly, usually on small systems at lower per Wp prices as a strategy to offer affordable product formats. These are the most common modules in Kenya.

The main trend factors driving sales growth are:

- continued low rates of rural electrification extension;
- rural income growth;
- increasing demand to power for cellular phones, computers and Internet connections in remote areas;
- increasing decentralization and the official/donor focus on rural development increases the demand for solar, given that there is usually no option of grid connection for remote project offices and housing;
- steady or falling pv prices due to international trends and, recently, entry of lower cost suppliers.

International interest in Uganda pv market is increasing. Two of the Uganda companies recently entered into discussions with international companies on the formation of joint ventures, in response to the proposed *ERT* program and information provided during preparation. One large panel manufacturer has been conducting market investigations to identify entry strategies. In 2000, Indonesian and Chinese balance of system components appeared for the first time, as a result of supplier data provided during *project* preparation

## Potential Market and Key Barriers

**SHS private domestic market segment** While sales have grown strongly in recent years from a low base, the estimated 400 units sold per year to private buyers are only a small fraction of the potential market. The immediate potential SHS market comprises dispersed households and shops who: (i) are not going to be reached in the near term by the main grid or an independent grid; and (ii) have high ability and willingness to pay, as often indicated by the current use of an automotive battery for TV/radio along with kerosene for lighting.

About 2 million households are located beyond the reach of foreseeable national grid or independent grid developments. Based on their current expenditures on energy services and products the potential market is about 20% of these households, i.e., 400,000 households. It is estimated that if a rural household spends about \$ 4 per month on kerosene and batteries, then it is a potential solar pv customer, particularly for smaller systems. In comparison, an ESMAP report, *Uganda: Rural Electrification Strategy Study, 1999*, based on a demand survey of 2,000 nonelectrified rural households in 12 (out of a total of 45) purposefully selected districts - which probably resulted in overestimates of expenditures - found that: (i) rural households paid, on average, over US\$6 per month on drycell batteries for torches, radios and radio cassettes, and (ii) approximately 10 percent of the surveyed households own lead-acid batteries, and spend about US\$ 10 per month on energy services.

**NGO and official/donor market segments** These segments together comprise the institutional market. While the needs in this market are high for energy for health, education, telecommunications and administration and security services, the ability to pay and the ability to develop technical solutions is limited. Subsidy funds to improve affordability are required for these institutions to become a key component for solar pv market development. The growth of this market segment is based on the availability of subsidy funds.

**Key barriers.** High prices are a main barrier to development of the PV market in Uganda. Retail prices in are much higher than in Kenya, and more than double the prices in Asian markets, while rural incomes are significantly lower. The high prices are related to an interlocking set of factors:

- low sales volumes and weak distribution networks, reflecting the small size and low capitalization of the companies currently selling pv in Uganda. None of the companies as yet has a well-developed distribution network reaching into rural areas. International supplier linkages are weak and supply costs are high, with small purchase lots, minimal supplier credit, and high international transportation costs to Uganda.
- the high costs of doing business in Uganda, as indicated by Bank supported and independent studies.
- taxes and duties, including the continued application of excise duty protection on behalf of the local battery company.

Affordability is low and there are no mechanisms in place to address high first cost issue of an SHS purchase:

- there are no operating SHS credit schemes or fee for service programs. Initial efforts under the UNDP/GEF pilot program to jump start solar pv lending from a bank and a microfinance institution have led to few transactions, although they have been successful in raising the awareness about solar pv.
- weaknesses in the financial sector makes it difficult for pv companies to secure term financing;



further, financial sector perceptions of high payment risks in rural based credits, especially for consumer goods, contribute to low lending rates.

- microfinance capabilities are fairly widespread, but costs are high and microfinance is often unsuitable for SHS purchases, with the maximum loan sizes usually being too low and the term periods too short.

Rural commercial marketing and distribution networks for pv are largely absent. The pv companies in Uganda are stuck at a low level equilibrium, with low sales volume, high prices, and weak distribution networks. The companies are small, entrepreneur driven, with limited financial capabilities. They have neither the resources nor the risk appetite for major investments on their own in rural marketing and distribution. Promotional efforts are limited, and insufficient to address market perceptions of poor quality of pv generated power (its not ac) and unwarranted expectations of possibilities of grid connections.

There are no mechanisms for assisting pv companies with market and business development and training. Nor are there capabilities to advise companies on pv system technology design, choice and troubleshooting.

## Program interventions and implementation

**Choice of institutional model.** A key choice that has to be made is between a competitive market development approach as opposed to a regulated concessions approach. The competitive market approach has been the basis of commercial pv sales growth in the most rapidly growing markets, such as Kenya and northwest China, and it is being applied with emerging successes in Bank supported projects in a number of Asian countries. Within the market development approach, a wide number of business models are being used, e.g., sales, hire purchase, leases, fee-for-service using direct sales, agents, franchise. Under the concession model, a company is given a monopoly over a geographical area in which it sells the electricity from the pv systems on a fee-for-service basis, i.e., the company owns the pv systems, even in cases in which they are installed on consumers' premises, and is responsible for their operation and maintenance. This model is in initial pilot stage in some Latin American countries, and is being developed in South Africa.

It was judged that the market competition model is better suited to Uganda for the following reasons:

- In Uganda, there are already a number of local firms involved in the solar pv business, so that there are good prospects for continued competition, and resulting price reductions, under market conditions
- In many of the Latin American countries, there is a well-established system of concession areas for various services, which is quite valuable in establishing solar pv concession areas. There is no such precedent in Uganda. Even in South Africa, the concession approach has not yet become fully operational.
- In most of the countries where the concession model is being piloted, the focus has been on providing service, often in an accelerated manner, to the relatively small proportion of the population that does not yet have access to grid electricity. In these cases, there large official subsidies are provided to the concession holders (e.g., the initial capital subsidy per SHS customer being discussed in South Africa is \$400) In contrast, in Uganda, most of the population lacks access to electricity and there is no capacity for large official subsidies. The focus is on reducing solar pv prices, so that solar pv systems can become more affordable, and any subsidies that have to be provided become more manageable

**Package of interventions.** Based on experience with solar pv program in other countries, a package of interventions is necessary to improve capacities and confidence in the consumer, business and financial sectors in pv business development and to increase affordability. The expected result would be strong growth in competitive, company-based pv sales and service networks extending into rural areas, offering private and institutional buyers a wide product and price range, with robust product standards and strong after sales and warranty services. These interventions are:

- strengthen the local pv business capabilities, reduce risk perceptions in business, finance and technical areas, and reduce risks of market entry through business development assistance aimed at achieving international best practice level
- support the development of marketing and distribution networks that provide quality, competitive products and services to rural consumers
- encourage additional investors and entrepreneurs to enter the sector
- increase the access of PV businesses to financial institution credits and customer access to end-user microfinance
- increase consumer awareness and confidence
- increase access to best price sourcing opportunities, including possibly the local production of some components
- establish a sound market framework in terms of tax and duty treatment and technical standards
- provide a per Wp GEF grant to increase affordability, consumer acceptance, and choice, including by lowering the first cost.

### ***Phase 1 targets***

The targets in the proposed program are ambitious. The Phase 1 targets build on the 2000 year, strengthened during the baseline year by capacity building and pipeline development during program preparation and assume a strong donor support for purchases of institutional systems for rural health services.

**Table 3.3 Target unit pv SHS sales, Phase 1**

Unit Wp size	baseline	Year 1	Year 2	Year 3	Year 4	Total
12		500	625	834	1,114	3,074
20		400	485	642	851	2,379
50		250	300	387	499	1,436
100		110	131	163	203	608
Totals	900	1,260	1,541	2,027	2,668	7,496

**Table 3.4 Target unit pv sales to NGO, official and donor segments, Phase 1**

Sales institutional	Baseline	Year 1	Year 2	Year 3	Year 4	Totals
Health Center II		43	27	77	63	210
Health Center III		36	24	36	42	138
Health Center IV		2	2	2	2	8
Total		83	53	115	107	356
Other institutional systems	100	200	300	400	1000	
Totals	80	183	253	415	507	1358

**Project Component 4 - US\$13.44 million****Cross-sectoral linkages**

This component will be implemented by the Ministries of Health, Agriculture, Education and Water.

In the **health** sector, the project will finance:

- In ten districts – Rukungiri, Arua, Nebbi, Kibaale, Kabaale Luwero, Mubende, Kumi, Pallisaa and Kotido/Moroto - 90% of the capital costs (IDA +GEF grant) of energy systems (including solar fridges and solar water heaters, as appropriate) for all HC II, III and IV that meet the eligibility criteria established by the Ministry of Health, and for the solar PV energy packages only, 25% of the cost of variable costs. The energy packages will be supplied and maintained by the private sector. This is expected to improve health care service for more than 75% of the population in these 10 districts.
- technical assistance, for (i) implementation support, (ii) workshops, information dissemination and capacity building, and (iii) monitoring and evaluation.

In **agriculture**, the project will finance (i) private sector investments through the RE Fund for connection of priority agricultural loads, and (ii) technical assistance to the Ministry for program promotion as well as monitoring of program impacts.

In **education**, the project will finance:

- In ten districts - to be selected by the Government in consultation with the Bank - 90% of the capital costs (IDA + GEF grant) of energy/ICT packages in selected post-primary schools
- technical assistance to the Ministry to (i) develop an energy policy and guidelines for education, (ii) implementation support, (iii) workshops, information dissemination and capacity building, and (iv) monitoring and evaluation.

In the **water** sector, the project will finance technical assistance to the Ministry to identify and meet energy needs of the recently completed rural water strategy, develop energy guidelines and capacity building and monitoring and evaluation.

## Background - Health Sector

Electricity is a key input in providing quality health care service, even in rural areas. In the absence of electricity, lighting is done with a hurricane lamp, sterilization with charcoal or firewood and water-heating is only done if there is an excess of charcoal firewood - other wise the patients have to make do with cold water. Also the staff houses are without energy, which makes it difficult to retain staff in the rural areas, who are used to having access to TV or just being able to read at night. The objective of the health component is to address the energy needs in the health sector and improve rural health care service delivery, by offering standard energy packages to Health Centers II, III and IV including staff houses. The health centers will, through the private sector, be provided with the most appropriate energy solutions to fulfill the energy needs in the most cost effective way. HC II and HC III will mainly be receiving solar PV energy packages, while the energy solutions for HC IV will be on a case-by-case basis.



*At rural health clinics, such as this Health Center II unit, women have to give birth in darkness or with open windows during the day because of lack of adequate lighting*

## Energy and ICT's role in improving health care service

Under this program a study in collaboration with MoH on the energy needs in Rural health facilities has been carried out. The study included field visits to 60 health facilities in 5 districts and interviews with local government, MoH, end users and staff in HC; the study was completed in November 2000, and the main findings from the report are:

- access to energy will make a significant contribution to improved health care service in rural areas. Both at the Health center itself in the form of service offered but also in staff facilities which could help retain staff in remote rural areas – where it often is difficult to get staff to stay, due to lack of modern living conditions.
- improving the energy supply in health facilities will give an improved quality of service which will benefit women and children in particular, since they carry the brunt of the burden of ill-health. Especially early access to emergency obstetric care will undoubtedly reduce both maternal and

peri-natal deaths and improved management of malaria and diarrhea in children will prevent premature deaths.

- increased access to energy will facilitate efforts to achieve the goals of the Health Sector Strategic Plan (HSSP) and the Uganda National Minimum Health Care Package (UNMHCP).

It is one of HSSP's principal aims to implement the UNMHCP with a focus on the quality of service provided and through this package reduce inequalities in access to service for various segments of the population. The technical health care programs, which constitute UNMHCP, are regarded as cost effective interventions considered to have the highest impact on reducing morbidity and mortality from the major contributors to the burden of disease. The twelve technical programs as well as the energy sector's potential contribution to these programs is shown in Table 4.1 At the same time, it is clear that in individual situations, factors other than energy or ICTs may pose a greater constraint to delivery of quality health services, and hence have a higher priority than improved energy/ICT supply.

**Table 4.1: Potential Energy/ICT Sector Contribution to UNMHCP**

<b>UNMHCP Programs</b>	<b>UNMHCP Objectives/targets that are dependent on energy/ICTs</b>	<b>Supporting services that would benefit from an improved energy and ICT supply/ <i>Benefits derived</i></b>
<b>1. Control of Communicable diseases</b>  - Malaria     - STD/HIV/AIDS        - TB	Increase in population receiving effective treatment	Laboratory services, better light source for microscopes <b><i>More reliable test results</i></b>
	Reduce malaria case fatality	Laboratory services and blood bank <b><i>As above and blood transfusion for anemic children</i></b>
	Increase condom use	TV/Radio for communications <b><i>Extends opportunity for awareness raising</i></b>
	HC IIIs and above to provide HIV counseling and testing	Laboratory services including fridge <b><i>HIV status known and informed decisions can be made</i></b>
	Reduce mother-to-child HIV transmission	Adequate lighting during deliveries <b><i>Less danger to mother and health worker</i></b>
	HIV free blood for transfusion	Laboratory services and blood bank <b><i>Reduction in HIV caused by blood transfusions</i></b>
	Universal infection control procedures in all health units	Sterilization, lighting, laboratory services <b><i>Reduction in nosocomial infections</i></b>
	Increase in TB success rate	Laboratory services, better light source for microscopes <b><i>More reliable test results and earlier recognition and treatment of TB</i></b>

<b>2. Integrated management of Childhood Illness</b>	Reduce Case Fatality Rate from diarrheal diseases	Laboratory services, lighting <b><i>More reliable test results, Easier to set a drip</i></b>
	Improved referral system	Radio communication <b><i>Reduces delays</i></b>
	Increased community awareness	TV/Radio for <b><i>communications</i></b> <b><i>Opportunity for awareness raising</i></b>

<b>3. Sexual and Reproductive Health &amp; Rights</b>	Increase access to emergency obstetric care	Operating lights, laboratory services, blood bank, medical equipment, lighting, communication <b><i>Timely and more effective service delivery for safe motherhood.</i></b>
	Strengthen referral services	Radio communication <b><i>Reduces delays</i></b>
	Increase antenatal and postnatal coverage	TV/Radio <b><i>Opportunity for awareness raising</i></b>
	Advocate for sexual and reproductive rights	TV/Radio <b><i>Opportunity for awareness raising</i></b>

<b>4. Immunization</b>	Functional cold chain	Vaccine fridges and freezers <b><i>Potent vaccines, more outreaches</i></b>
	Communication for immunization	TV/Radio <b><i>Opportunity for awareness raising</i></b>
	Strengthen HMIS	Computers <b><i>Better data enable improved health policy development, management and targeted service delivery</i></b>

<b>5. Environmental Health</b>	Safer water in health facilities	Water pumping, purification <b><i>Cleaner health units, reduction in nosocomial infections</i></b>
	Promotion	TV/Radio <b><i>Opportunity for awareness raising</i></b>

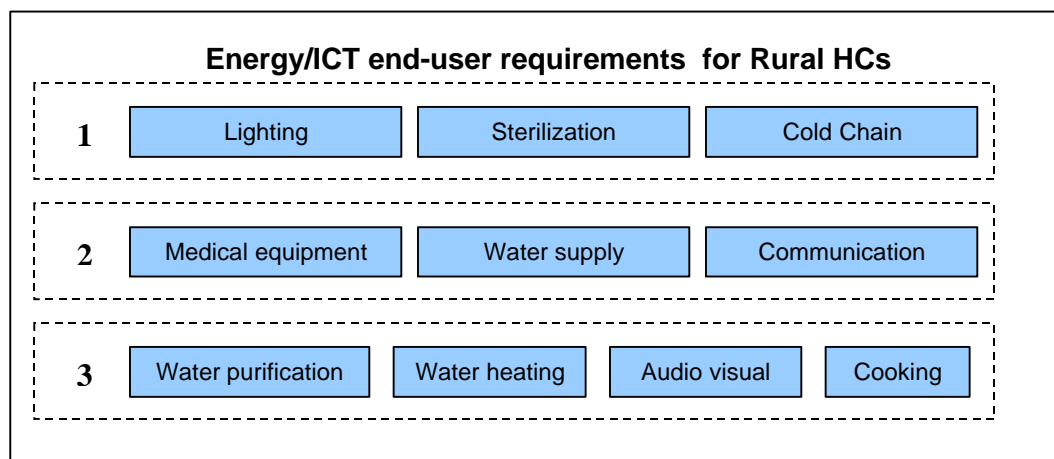
<b>6. Health Education and Promotion</b>	To promote individual and community responsibility for better health	TV/Radio <b><i>Opportunity for awareness raising</i></b>
<b>7. School Health</b>	Ensure health education and improve health seeking behavior	TV/Radio <b><i>Opportunity for awareness raising</i></b>



<b>8. Epidemics and Disaster Preparedness &amp; Response</b>	Strengthen the National laboratory support network at all levels	Laboratory services <b><i>More reliable test results enable more effective treatment</i></b>
	Improve on communication and referral	Radio communication <b><i>Faster response to epidemics</i></b>
	Conduct gender responsive communications	TV/Radio <b><i>Opportunity for awareness raising</i></b>
<b>9. Nutrition</b>	Increase public awareness on appropriate nutrition practices	TV/Radio <b><i>Opportunity for awareness raising</i></b>
<b>10. Interventions against diseases targeted for elimination or eradication</b>	Conduct gender responsive communications	TV/Radio <b><i>Opportunity for awareness raising</i></b>
<b>11. Mental Health</b>	Educate populations on mental health promotion and address effects of violence, including violence against women	TV/Radio <b><i>Opportunity for awareness raising</i></b>
<b>12. Essential Clinical Care</b>	To provide basic care for common illness including non-communicable diseases and injuries	Sterilization, lighting, laboratory services, refrigeration <b><i>Better differential diagnosis, drug storage, reduction in nosocomial infections</i></b>

### Energy/ICT services modules for health sector – a phased building-block system

The main energy/ICT end-use requirements identified as being critical for improving the effectiveness of health care services and to support UNMHCP can be seen in the below figure with group one being the one to address first, followed by two and three.



Each of these end-uses forms a module, which can be installed on its own, while at the same time fitting in with other modules. This modular system offers flexibility in choice and timing. For example, a HC can start to meet its most immediate needs with a “basic package,” and when additional funds become available, more building blocks can be added so, e.g., it could acquire a “comprehensive package.”

Further, the contents of each module vary by the type of HC, in order to better suit the needs of each individual health facilities, which makes it possible to install the most suitable energy/ICT option for a specific health facility. As access to the grid is extremely limited, the energy packages will largely be Solar PV packages. However, due to the high energy demand at HC IV, it will be decided on a case-by-case basis whether it is more feasible to extend the grid. The indicative basic and comprehensive energy packages and expected benefits for HCII-IV are shown in Tables 4.2- 4.4.

**Table 4.2: Indicative Packages for Health Center II**

<b>Basic Package</b>	
<b>Module</b>	Improvements in health center <i><b>Impact on health service delivery</b></i>
<b>Lighting</b> <ul style="list-style-type: none"> <li>Basic general lighting in OPD/staff houses</li> <li>Basic security lighting in OPD/staff houses</li> </ul>	<ul style="list-style-type: none"> <li>Extended evening opening hours</li> <li>Adequate lighting during deliveries</li> <li>Outdoor lighting at night</li> <li><i><b>Increased service hours - more people served</b></i></li> <li><i><b>Examination and treatment at night, as needed, possible</b></i></li> <li><i><b>Prevents delay in treatment – secure environment attract people also at night</b></i></li> <li><i><b>Increases security at maternal deliveries</b></i></li> <li><i><b>More accurate diagnosis</b></i></li> <li><i><b>Higher staff retention</b></i></li> <li><i><b>Opportunities for distance training of nurses</b></i></li> <li><i><b>Opportunities for better administration</b></i></li> <li><i><b>Improved living and working conditions for staff</b></i></li> </ul>
<b>Cold Chain</b> <ul style="list-style-type: none"> <li>Solar PV Vaccine fridge</li> </ul>	<ul style="list-style-type: none"> <li>More reliable cold chain</li> <li>Improved drug storage</li> <li><i><b>Greater retention of potency of vaccines</b></i></li> <li><i><b>Lower immunization failure rate</b></i></li> <li><i><b>Increased immunization through out-reach</b></i></li> <li><i><b>Better infection control</b></i></li> </ul>
<b>Comprehensive Package</b>	
<b>Basic HC II package plus:</b>	<b>Basic HC II package plus:</b>
<b>Lighting</b> <ul style="list-style-type: none"> <li>Extended general lighting</li> <li>Extended security lighting</li> </ul>	<ul style="list-style-type: none"> <li>Better in-door and out-door lighting system</li> <li>Better lighting system at staff facilities</li> <li><i><b>Better quality service and examination night and day – appropriate working conditions</b></i></li> <li><i><b>Marked improvement of staff living conditions</b></i></li> </ul>
<b>Sterilization</b> <ul style="list-style-type: none"> <li>Thermal sterilizer</li> </ul>	<ul style="list-style-type: none"> <li>Improved sterilization procedures</li> <li><i><b>Reduced risk of infections</b></i></li> </ul>
<b>Water supply</b> <ul style="list-style-type: none"> <li>Solar Water pump</li> </ul>	<ul style="list-style-type: none"> <li>Increased water availability</li> <li><i><b>Improved patient conditions due to no restrictions on water intake</b></i></li> </ul>

<b>Water Heating</b> <ul style="list-style-type: none"> <li>Solar Water heater</li> </ul>	<ul style="list-style-type: none"> <li>Warm Water</li> <li><b>Particularly useful during maternal deliveries</b></li> </ul>
<b>Audio visual</b> <ul style="list-style-type: none"> <li>Capacity to run one TV/VCR and 3 radios at the staff houses</li> </ul>	<ul style="list-style-type: none"> <li>Information dissemination</li> <li><b>Greater retention of qualified staff due to improved living conditions</b></li> </ul>

**Table 4.3: Indicative Packages for Health Center III**

<b>Basic Package</b>	
<b>Modules</b>	Improvements in health center <b><i>Impact on health service delivery</i></b>
<b>HC II basic package plus:</b>	<b>HC II basic package plus:</b>
<b>Lighting</b> <ul style="list-style-type: none"> <li>Basic general lighting in Gen. Ward/ laboratory/ clinical officer</li> <li>Basic security lighting in Gen. Ward/ clinical officer</li> <li>Examination lights</li> <li>Lighting in Laboratory</li> </ul>	<ul style="list-style-type: none"> <li>Lighting in wards, laboratory and clinical officers house</li> <li>Better possibilities for setting IV drip at night , particular for children</li> <li>Adequate lighting for diagnosis</li> <li>More reliable test results from lab.</li> <li>Improved testing of HIV &amp; TB and malaria</li> <li><b><i>Better treatment of dehydrated, anemic and diarrheal children</i></b></li> <li><b><i>Better night nursing care at wards</i></b></li> <li><b><i>Better differential diagnosis</i></b></li> <li><b><i>Earlier recognition of malaria, TB and HIV</i></b></li> </ul>
<b>Cold Chain</b> <ul style="list-style-type: none"> <li>Solar Vaccine fridge</li> <li>Solar General purpose fridge</li> </ul>	<ul style="list-style-type: none"> <li>Cold chain for insulin</li> <li><b><i>Availability of insulin will save additional lives</i></b></li> </ul>
<b>Water heating</b> <ul style="list-style-type: none"> <li>Solar Water heater</li> </ul>	<ul style="list-style-type: none"> <li>Warm Water</li> <li><b><i>Increase hygiene with warm water for patients especially during deliveries</i></b></li> </ul>
<b>Comprehensive Package</b>	
<b>Basic HC III package plus:</b>	<b>Basic HC III package plus:</b>
<b>Lighting</b> <ul style="list-style-type: none"> <li>Extended general lighting</li> <li>Extended security lighting</li> </ul>	<ul style="list-style-type: none"> <li>Better in-door and out-door lighting system</li> <li>Better lighting system at staff facilities</li> <li><b><i>Better quality service and examination night and day</i></b></li> <li><b><i>Marked improvement of staff living conditions</i></b></li> </ul>
<b>Sterilizing</b> <ul style="list-style-type: none"> <li>Thermal sterilizer</li> </ul>	<ul style="list-style-type: none"> <li>Improved sterilization procedures</li> <li><b><i>Higher degree of sterilization of instruments, syringes and needles</i></b></li> </ul>
<b>Medical Equipment</b>	

<ul style="list-style-type: none"> <li>Electrical microscope</li> </ul>	<ul style="list-style-type: none"> <li>Improvement in laboratory test results</li> <li><b>Better differential diagnosis</b></li> </ul>
<b>Water Supply</b> <ul style="list-style-type: none"> <li>Solar Water pump</li> </ul>	<ul style="list-style-type: none"> <li>Increased water availability</li> <li><b>Improved general patient conditions due to no restrictions on intake of water</b></li> </ul>
<b>Communication</b> HF- Radio communication	<ul style="list-style-type: none"> <li>Strengthen referral service</li> <li><b>Reduces delays for referrals</b></li> </ul>
<b>Audio visual</b> <ul style="list-style-type: none"> <li>TV/VCR for EIC</li> <li>Capacity to run 2 TV/VCR, 4 radios and 1 fridge at the staff quarters</li> </ul>	<ul style="list-style-type: none"> <li>Information dissemination</li> <li><b>Awareness raising about STD, HIV, immunization etc.</b></li> <li><b>Marked improvement of staff living conditions</b></li> </ul>

**Table 4.4: Indicative Packages for Health Center IV**

<b>Basic Package</b>	
<b>Modules</b>	Improvements in health center <b>Impact on health service delivery</b>
<b>HC III basic package plus:</b>	<b>HC III basic package plus:</b>
<b>Lighting</b> <ul style="list-style-type: none"> <li>Basic general lighting in Mat. ward, doctors house / gen. Staff houses</li> <li>Basic security lighting in Mat. ward, doctors house</li> <li>Lighting in Theatre</li> </ul>	<ul style="list-style-type: none"> <li>24 hours emergency surgical services</li> <li>Better obstetric emergency care</li> <li><b>Reduce maternal deaths</b></li> <li><b>Reduce child mortality</b></li> </ul>
<b>Sterilizing</b> <ul style="list-style-type: none"> <li>Autoclave</li> </ul>	<ul style="list-style-type: none"> <li>Proper sterilization of surgical equipment</li> <li><b>Reduce post-surgical infections</b></li> </ul>
<b>Cold Chain</b> <ul style="list-style-type: none"> <li>Solar Blood Fridge</li> </ul>	<ul style="list-style-type: none"> <li>Blood bank – safe blood</li> <li><b>Blood transfusions possible</b></li> </ul>
<b>Communication</b> <ul style="list-style-type: none"> <li>HF- Radio communication</li> </ul>	<ul style="list-style-type: none"> <li>Improved referral service</li> <li><b>Reduce delays for referrals</b></li> </ul>
<b>Audio Visual</b> <ul style="list-style-type: none"> <li>TV/VCR for EIC</li> <li>Capacity for running 2 TV/VCR and 2 radios at staff quarters</li> </ul>	<ul style="list-style-type: none"> <li>Information dissemination</li> <li><b>Awareness raising about STD/HIV, immunization etc.</b></li> </ul>
<b>Comprehensive Package</b>	
<b>Basic HC IV package plus:</b>	<b>Basic HC IV package plus:</b>

<b>Lighting</b> <ul style="list-style-type: none"> <li>Extended general lighting</li> <li>Extended security lighting</li> </ul>	<ul style="list-style-type: none"> <li>Better in-door and out-door lighting system</li> <li>Better lighting system at staff facilities</li> <li><b>Better quality service and examination night and day</b></li> <li><b>Marked improvement of staff living conditions</b></li> </ul>
<b>Sterilizing</b> <ul style="list-style-type: none"> <li>Energy for hot air oven sterilization</li> <li>Thermal sterilizer</li> </ul>	<ul style="list-style-type: none"> <li>Improved sterilization procedures</li> <li><b>Higher degree of sterilization of instruments, syringes and needles</b></li> </ul>
<b>Medical Equipment</b> <ul style="list-style-type: none"> <li>Energy for medical equipment</li> </ul>	<ul style="list-style-type: none"> <li>Possibility for electrical medical equipment</li> <li><b>Extend the surgical services available</b></li> </ul>
<b>Water Supply</b> <ul style="list-style-type: none"> <li>Solar Water pump</li> </ul>	<ul style="list-style-type: none"> <li>Increased water availability</li> <li><b>Improved general patient conditions due to no restrictions on intake of water</b></li> </ul>
<b>Audio visual</b> <ul style="list-style-type: none"> <li>TV/VCR for communications</li> <li>Energy for computer use</li> <li>Capacity to run 2 TV/VCR, 5 radios and 2 fridge at the staff quarters</li> </ul>	<ul style="list-style-type: none"> <li>Information dissemination</li> <li>Computer facilities</li> <li><b>Awareness raising about STD, HIV, Immunization etc.</b></li> <li><b>3rd party opinion on complicated cases through tele-medicine</b></li> <li><b>Marked improvement of staff living conditions</b></li> </ul>

### APL1 (Phase 1) component

**Investment.** In phase 1 (about 4 years) of the ten-year program, ten districts – Rukungiri, Arua, Nebbi, Kibaale, Kabaale Luwero, Mubende, Kumi, Pallisaa and Kotido/Moroto have been identified for inclusion in this component. In each district all HC II, III and IV will get the basic energy package, provided they meet the eligibility criteria set up by MOH. This is expected to improve health care service for more than 75% of the population in 10 districts.

The size of the basic energy package differs from HC II, III and IV but the principle is the same, access to energy is provided and except for Solar PV fridges and Solar water heater, equipment will not be provided, only the energy needed to run the equipment listed.

**Table 4.5: Coverage of ERT health component in Phase 1**

	HC IV	HC III	HCII	Total
First year	5	36	43	84
Second year	3	24	27	54
Third year	11	36	77	124
Fourth year	9	42	63	114
<b>Total</b>	<b>28</b>	<b>138</b>	<b>210</b>	<b>376</b>

**Project costs and proposed financing plan.** The project costs for this sub-component are about \$ 6.4 million overall, The solar PV equipment of the energy packages will be eligible for a standard GEF grant. The remaining part will have to come from donor contributions, which could be channeled through the RE fund in some other fashion, to be decided during negotiations. See Table 4.6, with the financing plan shown in Table 4.7.

**Table 4.6: Phase 1 Cost Estimates for ERT health component**

	Number of facilities	Estimated unit cost for basic energy package (\$)	Total (\$ million)
HC IV	28	63,000	1.76
HC III	138	22,500	3.10
HC II	210	7,500	1.58
	<b>376</b>		<b>6.44</b>

Note: The estimates are based on solar PV costs prevailing in Uganda at the time of appraisal; it is likely that the costs will decline in the future. Further, the HCIV unit costs could be lower if, after a case-by-case analysis, it is found connection to a newly established mini-grid or main-grid extension is cheaper.

The component will cover 376 Health centers in ten districts over a four year implementation period. For each district the investment cost will be around \$644,000 of which MOH is required to fund 10% which is \$64,440 per district. GEF grants are expected to cover about 10 % of the investment costs of Solar PV energy packages (depending on the size of the solar package and excluding fridges and water heaters) and the rest will come from an IDA credit or donor funds. It is recognized that the HC, the district and MOH are not in a position to bear all of the capital costs, even for the basic package. However, it is important that there will be some contribution to ensure ownership and the MOH contribution could come from the PHC conditional grant.

**Table 4.7 Financing Plan**

	\$ million
MOH/PHC CG	0.64
GEF	0.64
Donors	5.16
Total	6.44

The recurrent cost for the solar energy packages will cover maintenance and battery replacement costs, while for the HC IV, which are likely to be either connected to the grid or a mini-grid, the recurrent cost will be tariff based and metered. The total annual recurrent cost per district will be around \$41,100 for an average district when all HC are covered. MOH should cover the main part of the recurrent cost for the energy package through funds earmarked to each HCs receiving the package. It is suggested that the staff will cover the recurrent cost of the staff houses based on a flat rate of a nurse paying \$4/month, a clinical officer \$8/ month and a medical doctor \$16/month. For the solar PV energy packages, 25% of the cost of the maintenance contract will be financed by IDA. The recurrent cost for each health center can be seen in table 4.8 and the accumulated recurrent cost for all four years of the ERT component can be seen in table 4.9.

**Table 4.8 Annual maintenance contract cost in US\$**

<i>Per health center</i>	HC IV*	HC III	HC II
MOH budget	1,956	935	312
Suggested Staff contribution	444	190	63
IDA funds	800	375	125
Total	3,200	1,500	500

\* Only the HC IV receiving a Solar PV energy package will be eligible for a maintenance contract.

**Table 4.9 Accumulated Recurrent cost in phase for 10 Districts in US\$**

	Year 1	Year 2	Year 3	Year 4
MOH	51,893	103,785	181,624	259,463
Suggested Staff contribution	9,757	19,515	29,272	39,030
IDA	20,550	41,100	61,650	82,200
Total	82,200	164,400	272,546	380,693

## Technical Assistance

Technical assistance is needed to MOH for development of the energy policy and the Information Packages about health energy packages. Under the first phase of the program the skills of solar PV technology should be strengthened in MOH's infrastructure division to enable the staff to participate actively in the process of adjusting the standard energy packages or for upgrading the energy packages already in place.

The technical assistance will be as follows:

**1 Implementation support.** A consultant team will be hired to assist MOH with the ERT – health component over the four year period. The consultants will be in contact with and visit MOH at critical stages in the project to review progress on implementation and make recommendations on key issues. In between visits, the consultants will provide on-going support being available to answer questions, discuss issues and review project documents. Included in the support will be the following two tasks:

- HC eligibility study, an assessment of the eligibility of Health centers in each district according to the criteria developed by MOH.
- Preparation of the ERT-health component for Phase 2.

**2 Workshops, Information packages and Capacity building.** A communication specialist will assist MOH in developing Information Packages on health energy packages for the workshops and will also participate in arranging the workshops. This will be a part of the capacity building in the districts together with assistance to MOH within energy. Specifically training in MOHID on Solar PV and regional study trips for the ERT health component team.

**3 Monitoring and evaluation.** A scheme will be set up to monitor and evaluate the impacts access to energy have on health care service delivery in rural areas.

**Table 4.10: Cost estimates in US \$ of TA in the Health component**

Activity	Disbursement	Year 1	Year 2	Year 3	Year 4	Total
	category					
1	Implementation support incl. workshops and capacity building					
	Consultant	118,305	55,598	55,598	55,598	285,100
	Operational	11,788	5,894	5,894	5,894	29,470
	Training	55,720	27,860	27,860	27,860	139,300
	Sub-total					453,870
2	Monitoring and evaluation					
	Consultant	40,067	16,883	40,067	16,883	113,900
	Operational	7,650	5,100	7,650	5,100	25,500
	Sub-total					139,400
	Total					593,270

## Background - Agriculture

The Plan for Modernization of Agriculture (PMA) – a central element of Uganda's poverty eradication strategy - is key to enabling the population to improve their livelihood and ensure food security. The



modernization of the sector is expected to contribute to:

- Increase incomes by raising farm productivity
- Raise the share of agriculture that can be marketed
- Create on-farm and off-farm employment.

The PMA emphasizes the need for building linkages across the different ministries in order to achieve the goals of the PMA, as many of the areas mentioned in the six priorities areas lies outside the mandate for Ministry of Agriculture. There are two broad ways in which the **energy and ICT sectors** can assist with the transformation of the agricultural sector for the development of the rural areas.

- **Improve electricity access** in areas where lack of adequate and reliable electricity is a critical constraint to *agricultural production, agro-processing and post-harvest storage*. PMA foresees an increased use of power by farmers as they switch from subsistence to commercial farming— power being animal, solar, wind, biogas, hydro and geothermal forms of power – for operations as tillage, planting, weeding, chemical application, irrigation, harvesting and post-harvest handling and processing.
- **Increase access to critical ICT services.** Timely price information could be quite important for farmers, as could be building business relationships with outsiders. Beyond this, one of the components of the Agriculture sector program is dedicated to information dissemination, agriculture extension and agricultural education. Here ICTs, in particular rural community broadcasting, telephone helplines and in some cases community telecenters would greatly improve the government's ability to provide the necessary information to the farming community.

Often limited or lack of access to energy is a major barrier for investment in agricultural processing and the districts without energy lose potential investments on that account. However, if potential investors could be supported in developing an energy business (either as a mini-grid or by grid extension) where they can get energy for their agricultural related activities and at the same time provide the surrounding trading center, institution and households with energy – the scheme would be attractive. Further, the solar PV market will be built up under the ERT and that will mean expanding the market and making it attractive by providing a subsidy the first years to reduce the investment cost. Through the Rural Electrification fund it will be possible to get subsidies for extending the grid. This will lower the cost and make it more attractive for private investors to invest in energy access.

## Implementation arrangements

The PMA will create the enabling environment for private investment to take place in the agricultural sector. Energy and ICT will be an important contribution to make the enabling environment for investors to find interest in agricultural investments. Thus, the ERT-agricultural component will focus on guidance and promotion of the opportunities with the ERT program for investing in energy and/or ICT with technical support and subsidies from the rural electrification fund to lower the investment cost in energy access for agriculture related activities.

It will be the task of MAAIF under this component to sensitize the population about the opportunities for and potentials of access to energy and ICT under the ERT program as well as how to access the service offered to identify and assess projects for developing business plans. This will be done through a number of

feasibility studies on Energy and ICT packages in agricultural related activities. The study will include, but not be limited to, fish and dairy production, cotton ginning, grain milling. Based on these studies MAAIF can develop subsidy guidelines.

As investment in energy is expected by the private sector, there will be a close collaboration with the Private sector foundation (PSF) for support to the potential investors as a part of their Business to Business service and promotion of increased productive use of electricity and ICT by rural businesses. The PSF will provide business development support to start up a development of RE-related businesses, including cost-share grants to stakeholders. There will be established a manual of policies and operating procedures for guidance which also will include the arrangements for cost-share grants with business (this manual will be ready prior to the effectiveness of the subsidiary agreement).

The Commissioner of Planning will be the ERT coordinator in MAAIF and will work closely with the director of the PMA secretariat. The ERT coordinator will be responsible for creating the information package to go out to the districts and to create awareness of opportunities, inform about the framework for applying through ERT, rules for subsidies for investors and potential consumers and whom to contact for professional support.

## Investments

There will be no direct investment through MAAIF as is the strategy of the PMA. However, there will be \$2 million earmarked in the RE fund for subsidies for agricultural related investment in energy access. The subsidies will be given according to the guidelines for subsidies developed by REA in consultation with the MAAIF. Additionally there will be support from the PSF which can provide cost-share grants for business-plans development for RE investments. Finally, there will be technical assistance to MAAIF which will run over the four years.

## Technical Assistance

The technical assistance will be as follows:

**1. Preparation and Implementation support.** A consultant team consisting of an international consultant and a local consultant will be hired to assist MAAIF with the implementation ERT – agriculture component over the four year. The consultants will be in contact with and visit MAAIF at critical stages in the project to review progress on implementation and make recommendations on key issues. In between visits, the consultants will provide on-going support being available to answer questions, discuss issues and review project documents. Included in the support will be the following two tasks:

- Feasibility studies and development of subsidy guidelines
- Preparation of the next phase of the ERT-agriculture component

**2. Workshops, Information packages and Capacity building.** A local communication specialist will assist MAAIF in developing Information Packages on agriculture energy/ICT options for the workshops and will also participate in arranging the workshops. This will be a part of the capacity building in the districts together with assistance to MAAIF within energy.

**3. Monitoring and evaluation.** A scheme will be set up to monitor and evaluate the impacts access to energy/ICT have on the facilitation of the PMA.

**Table 4.11: Cost estimates in US \$ of TA in the Agriculture component**

Activity	Disbursement	Year 1	Year 2	Year 3	Year 4	Total
	<b>category</b>					
<b>1</b>	<b>Implementation support incl. workshops and capacity building</b>					
	Consultant	121,860	54,413	54,413	54,413	285,100
	Operational	7,293	6,393	6,393	6,393	26,470
	Training	31,825	31,825	31,825	31,825	127,300
	<b>Sub-total</b>					<b>438,870</b>
<b>2</b>	<b>Monitoring and evaluation</b>					
	Consultant	47,853	22,597	47,853	22,597	140,900
	Operational	6,900	4,600	6,900	4,600	23,000
	<b>Sub-total</b>					<b>163,900</b>
	<b>Total</b>					<b>602,770</b>

## Background - Education

In 1998, Ministry of Education and Sports (MOES) prepared the Education Sector Investment Plan (ESIP) for 1997-2003, to extend and expand secondary education and to absorb primary school dropouts. The ESIP priorities are to increase access to education; emphasize gender equity for education across all income classes and increase the efficiency of the education. While the main goals within secondary education are:

- Have one secondary school in every sub-county
- Plan to construct 850 community polytechnics
- Expand vocational and higher education

Expanding secondary schools, community polytechnics, and vocational training facilities would entail large investments in physical infrastructure, and present significant challenges in attracting qualified teachers. Better access to electricity and ICT services can facilitate expanding the course menu; improve the education management and administration; retaining the teachers and giving them the right tools to achieve their objectives; and, reducing the costs of education in a variety of ways.

*The objective is to improve the quality of education in ten districts by providing access to energy and ICT through the private sector to post-primary education facilities including the staff houses.* This will assist MoES to reach their goals of expanding opportunities for and access to post-primary education. Further, an energy policy or guidelines for energy/ICT in post-primary education will be developed.

## Implementation arrangements

The linkages between energy & ICT and education generally lacks good assessment and information. It is clear that the access to energy and ICT for rural educational facilities are very limited, but that if present a number of benefits would be evident and likely to apply to both students and teachers work, but also improved their living conditions. A study will be carried out to assess the energy needs in secondary education facilities and it will be the basis for developing energy guidelines and energy packages to post-secondary and vocational education facilities.

The first year will be focusing on preparing for the ERT education component and ensure that guidelines and study are ready so that implementation can start in the second year of the first phase. Thus, the first year will consist of TA for a study on the energy/ICT needs in post-primary education; development of energy/ICT guidelines for post-primary education; a detailed design of the energy/ICT packages according to the findings of the study and develop energy/ ICT guidelines and a eligibility study to determine the number of post-primary education facilities in ten districts that will receive the package.

Ten districts will be included in the component and as a starting point all post-primary schools are seen as eligible. However, in order to get the energy packages the education facilities has to fulfill a set of criteria. Those criteria are developed by MoES to ensure that there will be the intended benefit from the energy package e.g. that the physical infrastructure are there, that there are teachers in place etc. The coverage is yet to be determined and it will depend on the assessment which will be carried out in each district to determine the number of post-primary schools eligible. This study will be carried out in the first year together with development of information material about the energy/ICT packages as well as workshops will be held.

The implementation of the energy-packages and the maintenance, from the second year, will take place through the private sector which are required to set up a PV branch in the concerned district which would cover one or maximum two of the chosen districts. MOES will prepare the tender for the districts and will also examine the bids. The supply contract will be signed by the MOES while the maintenance contract will be signed by the CAO as the responsible for the districts. However, the district education officer will be the day-to-day responsible for the project. Additionally, the district will also be supervising the supplier and through the CAO report back to MOES on the performance of the supplier in form of an biannual supervision report for which the MOES has issued guidelines. If the supplier not is living up to the contract terms and guidelines issued by MOES action can be taken to stop the contract.

MOES will pay the investment costs while the districts will be responsible for the maintenance costs by quarterly paying the supplier the fee for the maintenance contract. The energy packages will also include the staff houses and thus, there will be payment expected from the teachers living in those staff houses. It will be the responsibility of the district to collect staff payment. There will be a signed memo of understanding between MOES and the CAO specifying the responsibilities regarding supply, maintenance and payment of the energy packages.

## **Investments**

The first year (of the four years phase of the ERT program) would only be TA to develop energy guidelines; do the assessment study and have internal MoES workshop, but no investments in energy packages. For the next three years, initial estimates for the component would be in the range of US \$2-2.5 million in capital cost for around ten districts with 8-10 schools (depending on size and number of schools present in each district). It is expected that MoES provide around 10% of the investment costs, if its solar then additional 10% could be covered by a GEF (Global Environmental Facility) grant and the rest could preferably be picked up by donors or be covered by an IDA credit. The recurrent costs are expected to be paid in full by MOES with staff contributions in the form of monthly flat-rates.

## **Technical assistance**

Technical assistance is needed to assess the energy needs in the post-primary education facilities, develop the energy policy and develop the energy packages for post-primary education as well create Information

Packages for the districts describing energy packages. Additionally TA would be for capacity building and monitoring and evaluation.

The technical assistance will be as follows:

**1 Preparation and Implementation support.** A consultant team will be hired to assist MOES with the ERT – education component over the four year period. The consultants will be in contact with and visit MOES at critical stages in the project to review progress on implementation and make recommendations on key issues. In between visits, the consultants will provide on-going support being available to answer questions, discuss issues and review project documents. Included in the support will be the following tasks:

- A study which will assess the energy/ICT needs in post primary education facilities.
- Develop energy/ ICT guidelines for post-primary education
- Energy/ICT packages for the different types of post-primary education facilities will be detailed and designed.
- A post primary education eligibility study of education facilities in each of the ten districts will be carried out.
- Preparation of the next phase of the ERT-education component.

**2 Workshops, Information packages and Capacity building.** A local communication specialist will assist MOES in developing Information Packages on education/ICT energy packages for the workshops and will also participate in arranging the workshops. This will be a part of the capacity building in the districts together with assistance to MOES within energy issues consisting of study trips for the ERT education component team.

**3 Monitoring and evaluation.** A scheme will be set up to monitor and evaluate the impacts on education service delivery and prepare the Phase II ERT-education component.

**Table 4.12 : Cost estimates in US \$ of TA in the Education component**

Activity	Disbursement	Year 1	Year 2	Year 3	Year 4	Total
	category					
<b>1</b>	<b>Implementation support incl. workshops and capacity building</b>					
	Consultant	128,677	56,503	49,960	49,960	285,100
	Operational	8,598	8,544	5,714	5,714	28,570
	Training	38,190	38,190	25,460	25,460	127,300
	<b>Sub- total</b>					<b>440,970</b>
<b>2</b>	<b>Monitoring and evaluation</b>					
	Consultant	18,803	42,647	18,803	42,647	122,900
	Operational	2,550	10,200	2,550	10,200	25,500
	<b>Sub-total</b>					<b>148,400</b>
	<b>Total</b>					<b>589,370</b>

## Background - Water

*The National Rural Water Supply and Sanitation Strategy* , (Draft, April 2000), operationalizes Uganda's National Water Policy (NWP, 1999) and sets forth the institutional framework, strategy and action plan for achieving a coverage of 100% of safe water to the rural population in the year 2015 against today's 47%

for water and 49% for sanitation. The short term goal is to have sustainable and safe water supply and sanitation facilities within easy reach of 65% of the rural population and 80% of the urban population by the year 2005. In order to reach those goals the strategy focus on a decentralised approach which is community demand responsive and involving the private sector in the service delivery.

Normally villagers in rural areas must walk to the water source and retrieve the water by hand from the source. Boreholes and shallow well equipped with a handpump or water from encapsulated springs are the commonly source of water supply for rural Uganda. Women often spend more than an hour a day to fetch water. Thus, water fetching is not only time consuming but also an additional drudgery for women who often is the responsible for water. By providing energy for the water supply the amount of water pumped on a daily basis can be much higher. The potential yield of the borehole can with an electrical pump be utilized to a larger extend as the pumping is not restricted by manpower. In effect this means that the number of boreholes necessary to cover the population will be lower as more water can be yielded from the existing or new boreholes.

Providing mechanized piped water systems, would have a number of benefits that would imply improved service to the public. Water can be pumped to an elevated storage tank through introduction of an electrical pump and fed by gravity via a pipe into a system of stand-pipes in the village. Such an arrangement would have the advantages of less risk of pollution as the water will be less exposed to pollution through shorter handling-time of by the consumer. Further it would be time saving as the transport time and distance between the water point and the home will be considerably reduced

*The objective is to assist the MWLE/DWD in improving the water supply service, by providing the least cost energy solutions to the communities where water schemes are to be installed. MWLE/DWD has a goal of having mechanized water piped systems in 251 growth centers and 78 urban settings for which energy is required, and the ERT Water component will assist in providing energy for those priority areas.*



***Modern energy can help overcome water scarcity in many rural areas of Uganda.***

## **Implementation arrangement**

The ERT Water component will cover ten districts which have different conditions in terms of water yield and possibilities for energy resources. The districts suggested by DWD are Kotido/Moroto, Arua, Nebbi, Moyo, Ajumani, Yumoz, Kabarole, Kyenjojo and Budibugyo.

The Water-energy component will only consist of technical assistance to MWLE/DWD, no investments will be included in the component, as the budget for water installation already includes costs for energy. There will be three categories of water supply where energy packages will be valuable.

- **Rural growth centers** with a population from 2000-5000 where a mechanized piped water systems could be installed.
- **Urban settings** with a population more than 5000 or gazetted district headquarters or town councils.
- **Institutions** which could be schools, hospital, army barracks, refugee camps etc. where large amounts of water are necessary.

The range of energy packages, designed specifically as an energy option for mechanized piped water supply system of different sizes will be offered to the communities through the existing institutional arrangements of water committees and group. It will be up to the communities in collaboration with the districts to choose the energy packages that goes along best with their water scheme, and which are both within the budget for investment and recurrent cost for that particular water scheme. For the institutions, DWD will assist with technical assistance, while investments has to be paid for by the individual institutions.

The private sector will be responsible for the service delivery and maintenance of the energy systems in a well integrated manner with the private sectors service delivery of the water schemes. However, it will be DWD who will have the overall responsibility of the implementation. A study on the energy needs in the Water sector will give the details and recommendations on the best energy solutions in the form of standard energy packages for water supply systems. Based on this DWD will issue guidelines on energy for water supply which the communities can use in their applications for water supply to be included in the annual district work-plans.

## **Technical assistance**

DWD will need technical assistance to develop energy guidelines for different types water facilities and defining the standard energy packages most appropriate. Assistance will be given for implementing the component and also capacity building support will be given to DWD to enhance the skills of the technical support units. Additionally a monitoring and evaluation scheme will be set up. The technical assistance will be in three parts:

- 1 **Implementation support.** A consultant team consisting of an international consultant and a local consultant will be hired to assist with the implementation of the ERT – water component over the four years. The consultants will be in contact with and visit DWD at critical stages in the project to review progress on implementation and make recommendations on key issues. In between visits, the consultants will provide on-going support being available to answer questions, discuss issues and review project documents. Included in the support will be :

- Support to DWD to develop energy guidelines for the different types of water supply and



how to incorporate those in the institutional set-up on all levels from water-groups to DWD.

- Assistance in defining the standard packages for rural growth centers, urban centers and institutions including costs and technical specifications.
- Preparing the next phase of the ERT water component

**2 Workshops, Information packages and capacity building.** A communication specialist will assist DWD in developing Information Packages (IP) on water energy packages to be presented at the workshops and go out to the water groups and communities. This will assist the communities and or water groups to make informed choices of energy packages. This will be a part of the capacity building in the districts which also will consist of building up the energy capacity in DWD and in the those of the regional workshops covering the districts in the component.

**3 Monitoring and evaluation.** A scheme will be set up to monitor and evaluate the impacts on water service delivery and prepare the next phase of the ERT water component.

**Table 4.13 : Cost estimates in US \$ of TA in Water component**

Activity	Disbursement	Year 1	Year 2	Year 3	Year 4	Total
	category					
<b>1</b>	<b>Implementation support incl. workshops and capacity building</b>					
	Consultant	122,031	54,190	54,190	54,190	284,600
	Operational	20,782	8,518	8,518	8,518	46,334
	Training	30,325	30,325	30,325	30,325	121,300
	<b>Sub-total</b>					<b>452,234</b>
<b>2</b>	<b>Monitoring and evaluation</b>					
	Consultant	43,460	18,240	18,240	43,460	123,400
	Operational	6,900	4,600	4,600	6,900	23,000
	<b>Sub-total</b>					<b>146,400</b>
	<b>Total</b>					<b>598,634</b>

#### **Project Component 5 - US\$14.78 million**

##### **Energy Sector capacity building, technical assistance, and training.**

This component would include support to both public and private sector to implement their respective roles, including establishment and training of the RE Board, RE Agency, and RE Fund, building of local project development capacity, low cost rural electrification designs, renewable energy development, and light-handed regulation to be undertaken at the local level. The Ministry of Local Government also will receive support to undertake the key information dissemination role in collaboration with the RE Agency, Private Sector Foundation, and other stakeholders as appropriate

For the **Rural Electrification Fund (REF)**, the project will finance the establishment and activities of the RE Board and RE Agency. These activities include preparation of Indicative RE master Plan, processing of subsidies for rural electrification, developing in-country expertise for rural electrification, and monitoring and evaluation of the progress of rural electrification.

For the **Ministry of Energy and Minerals Development (MEMD)**, the project will (i) finance pilot activities for efficient and clean biomass usage by households and small firms, and provide GEF grants for

(ii) development and implementation of a national renewable energy strategy and plan, and (iii) pilot activities for biomass gasification.

For the **Ministry of Finance**, the project will finance monitoring and evaluation of the poverty reduction impacts of rural electrification, and *via* the Private Sector Foundation with some funds provided by GEF, a variety of activities to support small and medium enterprises related to rural energy and for capacity building.

For the **Electricity Regulatory Authority**, the project will finance detailing of decentralized regulation appropriate for rural electrification and related rural capacity building. For the **Ministry of Local Government**, the project will finance the dissemination and promotion of rural electrification policies, and identification/mitigation of local concerns.

### **Background - Reporting, Monitoring, and Evaluation System**

Project reporting will be undertaken on a quarterly basis, with all implementing agencies providing regular reports in accordance with agreed formats. These agencies also will participate in a Mid-Term Review approximately half way through the project. In addition a Monitoring and Evaluation (M&E) program will be undertaken. The aim of the M&E program outlined below is to establish the effectiveness of the rural transformation approach, identify any constraints to the achievement of the stated objectives, and thereby inform and enhance both later phases of ERT in Uganda and similar programs in other African countries. The M&E program will:

- document the state of service (energy, ICT, water, health, education, roads) and economic and social welfare in a sample of host communities before the implementation of the ERT projects;
- track service provision and demand and economic and social welfare during the project lifetime in those communities and identify the changes brought about by the implementation of ERT projects;
- distinguish between the impacts on connected and unconnected (to electricity and ICTs) sections of the community;
- where possible, make comparisons with non-ERT communities, so as to distinguish ERT project impacts from other economy- and society-wide changes; and
- facilitate the drawing of lessons applicable to later phases of ERT and other AFRREI programs.

The M&E program has been designed with reference to existing research work relating to energy sector interventions, Uganda's Poverty Monitoring Surveys, the Uganda Participatory Poverty Assessment Process (UPPAP), and the Poverty Reduction Strategy Paper (Uganda Ministry of Finance 2000). Further, the M&E program fits in with the objectives of community participation, process transparency, continuous stakeholder feedback, and capacity building. With this in mind, the proposed M&E system has been designed to be run by Ugandan consultants supported by a team of international consultants with expertise in fields of particular relevance (poverty, enterprise performance, social capital, energy and the environment). In addition, the proposed system includes both survey-based and participatory monitoring and provision for feedback to the communities through written reports and workshops.

### **Links to the Ugandan Poverty Eradication Action Plan, Poverty Monitoring in Uganda**

The M&E program builds on the work of KaR, DFID, and ESMAP, World Bank, relating to the monitoring of energy sector interventions. However, care has also been taken to link the program to the anti-poverty agendas and plans of the Ugandan government and Ugandan civil society. ERT's focus on

rural transformation provides a strong link to the poverty alleviation agenda even though ERT's commercial approach means that the most immediate beneficiaries of rural electrification are likely to be businesses and households in the upper quartile of the local income distribution. It is because of this paradox that such an in-depth study of three early ERT project sites is needed. Where ERT projects cause or contribute to rural transformation and, as a result, poverty alleviation, it will be via its indirect effects on unconnected households over the medium rather than the short term. It will be through employment and income generation, through improved primary health care and education, improved access to clean water and communications, and through the far reaching effects of community participation. It is only by monitoring these indirect impacts over the relevant time period that the insights can be gained which are required to maximize future AFFREI projects' contributions to poverty alleviation in Uganda and elsewhere in sub-Saharan Africa.

In order to enhance comparability and promote dialogue, the M&E program uses the comprehensive and locally approved definition of poverty provided in the recent Uganda Poverty Reduction Strategy Paper. According to this definition, poverty has five major dimensions of poverty, income, illness, insecurity, isolation, and disempowerment, all of which are captured by the program. In addition many of the poverty- and policy-related indicators recommended in the Poverty Eradication Action Plan have been incorporated into the lists of indicators outlined above. Further, incorporating a mix of survey and participatory work into its design ensures that the M&E program is compatible with respect to not only definitions and indicators but also methodology. Finally, while designing this M&E program efforts were made to contact and involve many of the agencies taking part in the poverty monitoring. By continuing the resulting dialogue the M&E activities will both keep pace with and possibly contribute to the improvement of poverty monitoring in Uganda.

## Impact Pathways

ERT projects are explicitly targeted towards **enterprises** as it is they that are most likely to provide the critical link between electrification and enhanced ICTs and ultimate goal of rural livelihood transformation. There will be three types of enterprises: those within the grid area and connected; those within the grid area and not connected; and those outside the grid area. The first of these will be mainly light and motive-intensive enterprises who are likely to benefit both directly and indirectly from electrification. The second type will be mainly heat intensive enterprises who may benefit indirectly, but may also suffer negative effects and may move out of the grid areas in response to changes in relative land prices. The third type may benefit indirectly, but may also suffer some negative effects and those among them who could make productive use of electricity (light- and motive-intensive enterprises) may move into the grid areas.

- Through the enterprise sector, ERT projects could lead to rural transformation via:
- increases in investment - investment in electrical and ICT equipment will be necessary if ERT is to lead to increases in productivity and incomes;
- employment generation - capital intensity may increase leading to a loss of jobs, but, as long as aggregate demand ultimately grows, more jobs will be created;
- changes in prices of producer and consumer goods - in particular, reductions in the price of agro-processing services could especially benefit poorer households;
- reduced communications costs could lead to lower transactions costs and increased access to markets and technologies – the choice of income sources and, thus, the opportunity for income-source-diversification may increase and vulnerability to income shocks decline;
- improvements in the availability of producer and consumer goods - an expansion in overall economic activity could draw in new suppliers.

Electrification and ICT development will lead to rural transformation only if other binding constraints are relaxed. Inadequate access to credit could have highly negative consequences for the projects as could inadequate provision of other services and a poor institutional environments.

**Households** in and around the mini-grid systems will also fall into three categories: those within the grid areas and connected (generally higher income households); those within the grid areas but unconnected (generally lower income households); and those outside the grid area and so unconnected (all income levels). The latter two categories will make up the majority. Hence, it will be the indirect effects of rural electrification that will have the widest impact. These effects may include:

- increased off-farm rural employment in trading centres;
- enhanced local demand for agricultural produce;
- enhanced availability of consumer goods and production inputs;
- reduced transactions costs and the prices of consumer goods and production inputs, especially for agro-processing services;
- improved range of services and service quality at schools and hospitals;
- the potential not only for enhanced telecommunications but also better water supplies and sanitation systems;
- negative indirect effects, primarily working through prices.

In addition, connected households may benefit from reduced unit energy and communication costs, increases in energy usage, and greater opportunities for household-based SMEs. However, such improvements will depend on the households' ability to make investments in electrical and ICT equipment.

The existence of connected and unconnected households within the same rural area is likely to lead to changes in inequality. Initially and possibly even in the longer-run there could be an increase in local welfare inequality. Of greater interest, however, will be the absolute change in the welfare of the poorer members of the communities. The direction, magnitude, and precise cause of this change is our primary focus.

The provision of electricity and enhanced ICTs to **health and education service providers** in ERT project areas will benefit both connected and unconnected households in all income brackets. In the health sector, ERT projects will focus on sub-district facilities. At this level, the main impacts will include:

- improved night lighting for patients;
- better vaccine and blood maintenance through cold storage;
- better sterilization procedures;
- improved information exchange and dissemination between health facilities, and from facilities to the local community;
- improved facilities for staff, leading to better staff and lower turnover.

More and better schooling is not just an end in itself, recent empirical work suggests that it could also have strong positive effects on local incomes, rates of new technology adoption, health and nutrition. Local education facilities could benefit from:

- indoor lighting for evening and night-time activities;
- power for laboratory and workshop equipment for advanced curricula;
- improved residential facilities for teachers, leading to better teachers and lower turnover;
- provision for water pumping and purification;
- distance learning opportunities;
- power for equipment and facilities required for vocational training;
- the establishment of school-based income-generating enterprises and activities.

There are a number of potential constraints that could prevent the accrual of expected benefits via these service providers: affordability, few schools and health centres within the mini-grid areas will be able to pay the commercial cost of power; access, the majority of local schools and health facilities will fall outside the mini-grid areas - unconnected schools could deteriorate as the children of better off parents are moved; and inadequate supplies of other resources including drugs, textbooks, equipment, buildings, and trained staff.

There are three types of pathway through which **social and institutional capital**, i.e., social networks, organizations, levels of trust, rules, and norms, and ERT projects might interact.

- Social capital might affect ERT project sustainability. On paper, rural electrification projects fail because of specific technical and financial problems. However, most problems can be either avoided or overcome by good institutional design and/or a community that is willing to work together. Thus, greater project sustainability in communities with higher stocks of social capital can be expected.
- ERT interventions might affect communities' stocks of social capital and, hence, their levels of welfare. It is the social inter-mediation processes and community participation in ERT projects that are likely to have the greatest impact on stocks of bonding social capital. This in turn could not only enhance the sustainability of the ERT projects, but also have wider welfare effects through enhanced cooperation, reduced transactions costs, and improved information flows. In contrast the ICT component of the ERT interventions could lead to increases in bridging and linking social capital. they could reduce the cost of developing and maintaining both business and personal networks that extend beyond the geographical boundaries of the community.
- The network structure of both existing and emerging social capital might affect the distribution of the benefits relating to the ERT projects. Individuals with better social networks will have better access to information, resources, and opportunities. Thus, they will be in a better position to adjust their portfolio of activities and assets to take maximum advantage of the new electricity supplies. In contrast, members of the host communities with poor networks may find themselves excluded from both the economic and the social benefits.

## **Data and Data Collection**

All of the proposed indicators will be collected using a combined methodology containing both participatory and survey elements. The design of a panel survey will be informed by preceding participatory workshops in which the communities will be encouraged to evaluate their own livelihood strategies, discuss how ERT might affect those strategies, and identify aspects of their economic and social lives that should be monitored through the survey work. The surveys will then track samples of households and enterprises and the full population of service providers in a number of ERT-host communities over several years. A pre-project implementation participatory workshop and survey round will provide a basis for comparisons over time. Some participatory and survey work in control communities may facilitate comparisons across space and enable us to distinguish between economy-wide changes in key economic and social welfare indicators and the impact of the ERT projects. Every post-baseline survey round will be preceded by a participatory workshop and followed by presentations of key findings within the communities.

### *Indicators*

The quantitative **enterprise** indicators will be collected within the context of a best practice enterprise survey, designed to elicit good estimates of cash-flow and balance sheet figures even for enterprises with no books. The energy indicators will focus on coverage, usage, both in terms of the proportion who connect to the new supply and how much electricity and other types of energy are consumed, reliability, sufficiency, and costs, including average fuel and capital costs of energy use, average total costs of energy, and proportion of energy in total costs. These will be analyzed in conjunction with a number of economic indicators including the size and sectoral distribution of the enterprises in each site, non-agricultural employment, remunerated agricultural employment due to land owners working in non-agricultural enterprise hiring farm laborers, investment in and stocks of physical capital, sales and re-deployments of generators, value added, productivity, profitability, input and output prices, stocks of human capital, indebtedness, access to credit, exposure to other ERT interventions, and the characteristics and history of the entrepreneurs, their enterprises and households.

The quantitative **household** indicators will be collected as part of a best practice, general income and expenditure survey. The survey instrument will be closely linked to the long-standing Uganda National Household Survey, but will also contain a comprehensive set of questions on ERT interventions. The energy indicators will be similar to those for enterprises. However, greater emphasis will be placed on the disaggregation of energy sources and their efficiency factors under different uses. Variations in these indicators across income deciles can be considerable. Broader measures of household economic well-being will include total private consumption per person, food consumption per person, total income per person, and the degree of monetization of the household's economic transactions. Other indicators will relate to agricultural production and agricultural markets, the local unskilled wage, asset ownership, household-based SME activity, consumer good prices, housing quality, access to safe water and adequate sanitation, education and health status.

For **health and education service providers** the set of energy indicators will be similar to that collected for enterprises. For health providers, these will be combined with indicators relating to total numbers of patients treated per year, numbers of cases relating to indoor pollution, total numbers of vaccinations given, percent of vaccines spoiled, adequacy of sterilization procedures, availability of drugs and condoms, extent of outreach health work, staff, expenditures on equipment, and the condition of buildings. For schools they will be combined with indicators relating to enrollment rates, exam results, staff, staff-student ratios, hours of teaching, changes to curricula, expansions in vocational/skills training and in community and commercial activities, expenditure on textbooks, furniture and equipment, the condition of buildings, and fees. For both schools and clinics indicators relating to improvements in staff conditions and staff turnover will also be collected.

At the **community-level** participatory workshops will provide a forum for community members to explore their own experiences of living without and expectations of living with electricity and related services. Issues of distribution, project management and the survey component of the M&E will also be discussed. In addition, mini-surveys and key informant interviews will provide economic indicators relating to the availability and prices of key consumer goods, agricultural inputs, and agro-processing services, crop and other output prices, access to credit, distances to tarred road and transport to district centre and capital city, land rights, tenure, availability and inheritance, and access to common property right grazing land and forested areas.

**Social capital and institutional indicators** will be collected both during the participatory workshops and from households and enterprises individually. Survey and participatory instruments will be designed with reference to the World Values Survey, the World Bank's Local-level Institutions Survey and DFID's

Sustainable Livelihoods Strategy. These indicators will relate to the ethnic, religious, and geographical composition of the communities, key local institutions and organizations, the operations of and degree of individual involvement in local councils (levels I, II, and III), ERT-related groups and other community-based associations, levels of trust and trustworthiness, perceptions about ERT projects, individuals' senses of empowerment, extra community networks and access to communications technologies.

Finally, several indicators relating to **ERT project characteristics** will be collected during key informant interviews and stored in a form that is compatible with the household, enterprise and service provider data. These will include data on ownership, generation technology, extent of the grid, metering technologies, sources of investment finance, subsidy, loan terms, and interest rates, tariff structures and billing procedures, user charges outstanding, aspects of management, staff, problems encountered on each project and the types of solutions found, community issues, perceptions and aspirations.

#### *Participatory Workshops*

The program of participatory monitoring is to be designed in collaboration with a member of the Ugandan Participatory Poverty Monitoring team. It will involve livelihoods analysis, social mapping, institutional mapping, and, where appropriate, the construction of network diagrams, transect walks, and time-lines. The major challenge in the participatory work will be ensuring that the findings are comparable across time and space so that general lessons may be drawn. To this end several of the participatory exercises will be repeated in all the M&E sites and some exercises year after year in the same sites.

#### *Survey Instruments, Frames and Samples*

There will be four separate but related survey instruments:-

1. The Energy for Rural Transformation Enterprise Survey (ERTES) instrument;
2. The Energy for Rural Transformation Household Survey (ERTHS) instrument;
3. The Energy for Rural Transformation Service Provider Survey (ERTSPS) instrument; and
4. The Energy for Rural Transformation Community Survey (ERTCS) instrument.

Component 2 will focus on 3 ERT sites. For each:

- the enumeration areas will be defined according to a common protocol and will extend beyond the grid areas;
- sampling frames for households, enterprises, service providers will be constructed with the help of local council officials during walk-about and updated before each survey round;
- random samples of 100-150 enterprises and 300 households will be drawn;
- all enterprises and 50-75 percent of households in the baseline will be tracked over time;
- there will be a census of all service providers in the enumeration areas every year.

#### **Interpretation Methods/Analytical Methodology**

Within the annual M&E reports many of the direct effects of the ERT projects will be documented in simple tables and cross-tabulations. These will track proportions of connectors, electricity consumption and cost per unit, and investment in electrically powered capital equipment over time. They will also compare various welfare and performance indicators between connectors and non-connectors, various aspects of electrification between different types of connectors, and various energy-related welfare indicators across sites with different characteristics.

This quantitative analysis will be complemented by the findings of the participatory workshops. These more qualitative findings will also feed into the survey work through questionnaire and model design and

during interpretation. Later participatory workshops may take the results of some of the econometric work as their starting point for discussions aimed at building greater insight into the process of rural transformation both within the host communities and among the ERT implementing and M&E teams.

Some analyses of the direct effects and the identification of indirect effects will require the use of econometric techniques to control for other factors that could be causing the observed outcomes. The panel data will allow us to employ the most up-to-date techniques to control for unobserved variations across households and enterprises and to analyze dynamics in incomes, productivity and investment behavior.

During the analysis of impacts on poverty, a wide range of dimensions of well-being will be considered. The choice of indicators will be informed by the findings of participatory work. The consumption-based household poverty indicators such as those constructed by Appleton (1999) will be used. Changes in consumption-poverty will be assessed using standard poverty and inequality indices, modern decomposition techniques, and stochastic dominance tests. However, other welfare indicators will be assessed- such as those on nutrition, schooling and time. This will include an examination of whether there is evidence of changes in the intra-household distribution of welfare, including impacts which differ by gender. The health and education service provider, social and community-level indicators will be analyzed in conjunction with the household- and enterprise-level data.

## **Outputs and Audiences**

Three types of written output are envisaged:

- M&E reports documenting the findings of the surveys and participatory workshops;
- Community reports focusing on issues that are likely to be of interest to the host communities will be presented in both written form and during workshops; and
- 8 issues papers focusing on the effect of the interventions on energy consumption patterns, enterprise performance, employment, welfare and poverty, supply quality and demand of health and education services, investment, bonding and bridging social capital, and the effect of social capital on project sustainability.

In addition, the data base will be made available to other researchers within a reasonable period of time following data collection and cleaning.

There will be four distinct audiences for these outputs:

- the communities;
- the project team;
- Ugandan policy-makers; and
- the international development community including bilateral and multilateral donors.

## **Background - Biomass use and gasification**

Woody biomass (traditional fuels) account for over 95% of all rural energy supplies. Traditional fuels account for the vast majority of all energy use in the rural small and medium enterprise (SME) in key areas of agro-processing (fish smoking, tobacco drying, etc.), rural industry (lime, charcoal, brick, tile, etc. production), and the rural service sectors (eating houses/restaurants, hotels, bakeries). In each of these areas, traditional fuels account for a minimum of 25% of operational costs (hotels and restaurants) to as much as 90% (lime and brick production).

Traditional fuels will continue to play a predominant role in rural economic transformation. Government



has recognized the importance of working with the rural enterprise sector to improve the efficiencies of traditional fuel use. Work carried out in Uganda and other Sub-Saharan African (SSA) countries, and other developing countries, show that significant improvements in reducing traditional fuel consumption at relatively low costs (often through improved energy management) can be achieved.



***Low-cost innovations can significantly increase the efficiency of fuelwood use in brick-making, thus reducing the pressure on the environment while increasing the profitability of the brick-making enterprises.***

The benefits of such improvements are manifold. First, there are the obvious environmental benefits from reducing pressures on diminishing rural traditional fuel supplies. Second, improving efficiencies improve the returns on production of SMEs, thereby making them more viable, facilitating growth and expansion, and helping generate new employment. Third, improving efficiencies of traditional fuel use helps stimulate overall rural development by increasing the value added to rural economies relative to urban economies. Fourth, reducing costs to SMEs and increasing their incomes, help generate revenues for local authorities, thereby generating new opportunities to improve the provision of rural services and infrastructure. Energy is key to this transformation, and transforming the use of traditional fuels in these SMEs will help accelerate this transformation.

Technical assistance will be provided under the project through the MEMD to work with key private sector players and agencies (particularly the PSF), the REA, local authorities, NGOs and other active stakeholders in five districts (Arua, Kabale, Tororo, Mukono and Masindi) targeted for the first four years of ERT. This TA will focus on the following rural commercial SME sectors:

- Brick making;
- Lime production (from limestone);
- Fish smoking;
- Restaurants/eating houses and hotels.

## **Implementation arrangements**

At least one pilot activity will be identified in each of the five districts by working closely with the local authorities (LCs), private sector and NGOs in each district.

**Lime production.** A pilot might consist of organizing these producers for providing technical assistance in the field of energy management (lime kiln construction, fuel wood stacking, etc.), overall production management, and marketing. One of the reasons for low efficiencies of production is that producer prices are low due to both poor quality (due to poor firing techniques) and to lack of market organization. These will be target areas during Phase 1. TA will be contracted through the private sector or NGOs with experience in this field, working with local brick producers, local authorities, under the guidance of the MEMD. The bulk of the work will take place during Years 1 and 2 of the ERT.

**Brick production** is important throughout Uganda. At least two pilots will be designed under this TA component during Phase 1, preferably in different districts. As with lime production technical assistance in the efficient production of bricks is a prerequisite for overall energy efficiency improvements in the sector. Organization of producers, and improved firing will have a significant effect on the returns these rural producers get for their products. Revenues from the firing of the same number of bricks can easily be doubled through improving firing techniques, while additional revenues can be achieved through better marketing.

There is considerable experience in this field in Sub-Saharan Africa, and considerable success. The TA component of improved energy efficient brick production will build upon this. As with lime production, efforts to organize producers, particularly for receiving training and technical assistance, as well as management and marketing, will be crucial. Again, two pilot activities will be carried out through TA contracted through the private sector or NGOs with experience in this field, working with local brick producers, local authorities, under the guidance of the MEMD. The bulk of this work will take place in Years 1 and 2 of Phase 1.

**Fish smoking** is significant in many parts of the country. At least two, if not three pilots will be undertaken in these districts. Technical assistance will be contracted locally from experienced private sector and/or NGO consultants who have worked on this with the Fisheries Department on a pilot basis, and in Kenya and Malawi on a totally commercial level. Efficiency improvements will be gained both through improved energy management, as well as investment in improved smokers. Moreover, as with bricks and lime, considerable improvements can be made through organization, better business practices, particularly marketing. With higher returns, the benefits of improving energy use (wood use) will be directly translated to the fish smokers, who will then see the incentives for improving the use of wood in smoked fish production.

Three districts and projects will be identified during the third and fourth years of ERT, Phase 1. Technical assistance and training will be procured, and a program for working with fish smokers will be put in place. Training and technical assistance will be undertaken, and investments made during this period under the guidance of the MEMD, but also with the assistance of the Fisheries Department, and the MOLG.

**Eating houses and hotels.** Fuel wood and charcoal are of major importance in restaurants (eating houses) and hotels (hostels) throughout the country. These are found in trading centres throughout Uganda, and woody biomass expenditures rank as high as food expenditures in these establishments. Hotels consume considerable amounts of wood fuel for heating water, using very inefficient techniques. Commercial wood fuel in this sector is important in all five districts. Projects in this sector, particularly in the cooking and water heating fields, will be undertaken in each district during Years 1 and 2 of Phase 1 of the ERT. The

consultant, working with the MEMD, will work particularly closely with local business associations and the LCs in each of the five districts. Pilot activities have already been identified in Masindi and Mukono, and could form the basis for obtaining similar participation of key local stakeholders in each of the other three target districts.

## Technical assistance

Technical assistance regarding traditional fuels as wood and charcoal will be provided under this project through the MEMD to work with key private sector players and agencies, local authorities, NGOs and other active stakeholders in five districts (Arua, Kabale, Tororo, Mukono and Masindi) in the following sectors: Brick making; Lime production (from limestone); Fish smoking and for Restaurants and hotels.

For the four different sets of project activities (lime, bricks, fish smoking and restaurants/hotels) technical assistance will be provided during the project. These activities total US\$500,000 over the four year period, and are summarized in the Table below:

**Table 5.1 : Cost estimates of the TA for Traditional fuels**

Activity	Description	Disbursement	Year 1	Year 2	Year 3	Year 4	Total
1	<b>Improved Lime Production</b>	Consultant					
		Operational	\$25	\$25	\$0	\$0	\$50
	<b>Sub-total</b>		<b>\$60</b>	<b>\$35</b>	<b>\$0</b>	<b>\$0</b>	<b>\$95</b>
2	<b>Improved Brick Production</b>	Consultant	\$35	\$25	\$15	\$0	\$75
		Operational	\$45	\$30			\$75
	<b>Sub-total</b>		<b>\$80</b>	<b>\$55</b>	<b>\$15</b>	<b>\$0</b>	<b>\$150</b>
3	<b>Improved Fish Smoking</b>	Consultant		\$50	\$25	\$0	\$75
		Operational		\$15	\$25	\$25	\$65
	<b>Sub-total</b>			<b>\$65</b>	<b>\$50</b>	<b>\$25</b>	<b>\$140</b>
4	<b>Improved Energy in Hotels &amp; Restaurants</b>	Consultant			\$25	\$10	\$35
		Operational			\$40	\$40	\$80
	<b>Sub-total</b>		<b>\$0</b>	<b>\$0</b>	<b>\$65</b>	<b>\$50</b>	<b>\$115</b>
<b>Total</b>			<b>\$140</b>	<b>\$155</b>	<b>\$130</b>	<b>\$75</b>	<b>\$500</b>

## Introduction of Biomass Gasification Technology in Uganda

Uganda has a good supply of wood and wood products, wood based waste from Agricultural production etc. that all could be used for energy production. By gasifying wood and using the produced CO rich gas in conventional diesel generators the fossil fuel (e.g. diesel) amounts can be reduced significantly. Typically to less than 20%, which gives a good economy for electricity generation. However, even if gasification technology of wood is well known in many countries the experiences in Uganda are low to nonexistent. In order to facilitate an expanding market for renewable energy power generation based on biomass an initial step is to introduce the gasification technology in a systematic way taking use of some already existing infrastructure, as e.g. the National Forestry Collage in Masindi, the activities at Makerere University and knowledge from manufacturers and R&D institutions worldwide.

*The objectives are to (i) demonstrate the feasibility of biomass gasification for electricity generation and thermal productive uses, (ii) explore the possibility to use a variation of biomass fuel stocks, (iii) to train engineers and raise awareness of biomass gasification as a low cost renewable energy option for rural electrification and productive thermal uses and (iv) using gasification producer gas to improve energy efficiency and increase productivity in limestone operations.*

Essentially the program will be implemented in close cooperation between the Nyabeya Forestry College in Masindi (NFC), the Faculty of Technology at Makerere University, gasifier manufacturers and a selected Indian R&D institution. The gasification component is divided into three separate tasks.

- **Introduction of woody biomass technology to Uganda.** The size of electricity generation will in the first stage be chosen in the range of 100 - 200 kW, and linked to electricity supply to the NFC and some nearby trading centers.
- **Testing and technology adaptation of gasifiers to different fuels** will be done in cooperation with the ongoing R&D program at Faculty of Technology at Makerere University (linked with a R&D support from SIDA, Sweden). The installation of a smaller (< 50 kW) test gasifier to run various tests and evaluate different gasifier fuel stocks other than wood-based, like coffee husk, rice husk, saw dust etc. The technology evaluation will also imply installation of an Information and Communication Center (ITC) at the NFC to enable easy cooperation with the University and a selected Indian R&D institution, gas manufacturer etc. This will include testing procedures, protocol etc. but also physical connections over e.g. Internet.
- **Biomass producer gas used for limestone operations.** This means in practice that traditional lime-kilns using alternating layers of wood fuel and limestone will be redesigned to instead operate on produce gas from wood based gasifiers. The initial sizes of such limekilns are in the size of 5 - 10 tons of production per day. The overall objective for this task is to demonstrate the technical and economical feasibility in a commercial environment. In this particular case a local implementer is expected to provide adequate information for further awareness campaigns and technology dissemination.

## **Background – Private Sector Foundation**

The PSF was formed on August 24, 1995, by eleven private sector business associations to implement the Private Sector Competitiveness Project (PSCP). As a component and implementers of the PSCP, PSF was mandated to strengthen and institutionalize the partnership between Government, the private sector and Uganda's development partners, and provide a forum for private sector development initiatives. PSF has also been managing the Business Uganda Development Services (BUDS), a component of the PSCP, which links businesses with professional service providers under cost share grant arrangements. The BUDS covers all business sectors.

The PSF is a non-profit membership organization, with its members being the associations and professional societies of the private sector. It provides services to its 43 members. The membership comprises representation from almost all sectors of the economy including associations of micro-enterprise organizations and manufacturers. Among the Professional societies are the engineers, lawyers and accountants. The Uganda Investment Authority, the Uganda National Bureau of Standards and other public sector institutions that are important for private sector development are associate members of the PSF. Under the PSCP, the PSF is the implementing agency for strengthening the UIA.

The Private Sector Foundation will be a key partner in the rural electrification program. The RE program is predicated on a private sector investment response to the policy, regulatory and planning frameworks which have recently been set in place, replacing the earlier framework of a Government led RE under the aegis of a state owned national utility.

The Private Sector Foundation, as an apex private association whose members are the associations of the private sector across a wide range of sectors and professions, is a main institution in the dialogue between official and private sectors on development and other issues. With its role in providing rural electrification business development services the PSF will be well positioned to facilitate this dialogue on RE matters. The PSF will take a pro-active approach to this task, forming joint workgroups, hosting public-private discussion sessions and presenting information to relevant official agencies in order to ensure a constant flow of information.

Business and market development services will be provided to entrepreneurs, micro-enterprises and SMEs, investors, finance organizations, NGOs and CBOs and other private entities to address skills and information barriers that constrain their response to rural electrification and ICT business opportunities in ERT areas. The services and related market entry and capacity building support to rural electrification related businesses will be provided on a cost share basis to clients at all stages: (i) pre-investment, including assistance in developing business plans and applications as required for commercial financing and for REF, GEF and other subsidies; (ii) start up and early business and market development; (iii) business improvement and growth. The targeted business sectors for the business to business services on a cost share grants basis include independent grids, solar pv, co-generation and ancillary manufacturing, financing, and services businesses. Existing and potential businesses, most of them micro, small and medium scale enterprises, that have the opportunity to contribute to rural transformation through the increased use of electricity for productive purposes will be an important target category on non-cost share services for capacity building and rural enterprises development.

### **Business Opportunities**

Opportunities for businesses are in the production, installation, supply of equipment and services by energy-related and other enterprises and financial organizations. These include, among others,

- Solar photovoltaic
- Component producers
- Traditional fuels
- Minigrids
- Power-related service companies

Rural electrification and the expansion of telephony and opening of points of presence will open opportunities for micro and SMEs in agro-processing and other sectors for business growth and improvement and for the establishment of new businesses.

### **Scope of services**

There are six broad tasks:

- **promote business opportunities in project areas to the private sector** by providing information on RE business opportunities to potential private investors and clients through public relations, advertising, direct marketing and participation in appropriate workshops and other events in Kampala and up-country.
- **provide business development support services** to assist the start-up and development of RE related businesses, including through cost-share grants. The services, which would be tailored to the needs of specific clients or groups of clients, would cover a full range of business planning

assistance including market segmentation and assessment, business concept and strategy development, technology choice and management, organizational design, financing, marketing and distribution, human resources, information technology and internal controls.

- **develop the capacities of financial and technical organizations** to support RE related businesses; Provide support to develop the service capacities of financial and technical organizations and others to support renewable energy and private sector led rural electrification investments and benefit a range of related business enterprises, including solar pv companies. For financial organizations this will include continuous networking, joint field visits and workshops to provide them data on RE financing opportunities, the activities of RE businesses, and international best practices in RE related financing.
- **promote increased productive uses of electricity and ICTs by rural businesses**, especially by micro and SMEs. Through these services the PSF will aim to establish linkages between existing and potential rural enterprises in ERT areas with sources of credit, technology and business development support and provide information and guidance on increasing productive uses of electricity. Through arrangements with NGOs, CBOs, microfinance organizations and other entities, information on technology options, costs and suppliers will be provided to assist and accelerate the process of entrepreneurs and SMEs taking advantage of the business development opportunities created by the RE and ICT investments in ERT areas. The services will include advice on switching from traditional fuels.
- **operate the GEF sales based performance grants program for solar pv businesses**. The solar market development program will be implemented by private pv companies (including NGOs or other entities in the pv business), who would market, sell or provide on a leasing or service basis and install pv products and provide after sales services. The pv companies will be eligible for all the PSF's business development services, including the cost share grants. In addition, they will be eligible for performance grants for commercial sales to consumers and institutions. Procedures and criteria, which the PSF will set forth in a manual, acceptable to the Bank and the MOF, for the sales based pv performance grants will be agreed prior to the effectiveness of the Subsidiary Agreement between the MOF and PSF.
- **facilitate the two way flow of information between government and the private sector on business opportunities and constraints in project areas**. Provide two-way information and consultative dialogue channels between the private sector and official agencies on RE frameworks, constraints and business opportunities.

## Investments

The investments, all made in Year 1 to facilitate the objectives of PSF comprise of computers, printers and other office equipment as well as three 4\*4 vehicles. It totals 139,500 USD, making the grand total for the business development component 5,598,500 USD, including the TA.

**Table 5.2 : Cost estimates of TA for Business Development**

TA	Description	Disbursement category	Year 1	Year 2	Year 3	Year 4	Total
1.	Grants	Operations cost	355,000	565,000	920,000	1,361,000	3,201,000
2	Business to Business service	Consultancy	199,000	194,000	197,750	205,250	796,000
3	Capacity building	Training	176,000	133,000	133,000	133,000	575,000
4	Rural enterprises development services	Consultancy	88,000	118,000	139,250	161,750	507,000
5	Financial management and audits	Operations costs	55,000	75,000	125,000	125,000	380,000
	<b>TOTAL</b>		<b>873,000</b>	<b>1,085,000</b>	<b>1,515,000</b>	<b>1,986,000</b>	<b>5,459,000</b>

## Background - Ministry of Local Government

Rural electrification is a crucial element for Uganda's development. It depends considerably upon the framework local authorities provide to investors. With decentralization, local authorities have a major and substantial powers to promote, or discourage, investments in rural electrification. According to the Electricity Act (1999), local authorities are the regulatory bodies for investments in the electricity generation of 2MW or less. This makes them key stakeholders in the rural electrification process. However, currently there is very little information available to local authorities by which to promote rural electrification, or participate in any capacity in projects. There are further widespread perceptions and confusions that the central Government of Uganda will continue to play a direct role in investing in rural electrification, particularly extending the main grid to remote and rural areas. Little or no information exists about the Rural electrification Fund, how it will work, who will have access to funding and under what procedures.

*The objective is to facilitate the implementation of the Uganda ERT program and through information campaigns inform and familiarize local districts and councils about the ERT program about their role in the new commercially oriented approach to rural electrification.* There is a need to describe the ERT, the REF, the other key agencies who will be implementing the ERT (Ministry of Health, Ministry of Education and Sports, Ministry of Agriculture, Ministry of Water Private Sector Foundation, NGOs,) and the roles of, and opportunities for, local authorities to promote the activities of these stakeholders envisaged under ERT, to help coordinate those activities in rural areas in order to maximize their impact, and indeed to promote and invest in rural energy.

In practice, this should take place through a logical sequence of activities:

- **Rural Energy Board (REB) Representation:** The Ministry of Local Government (MOLG) should be represented on the REB, and therefore play a key role in the evolution and promotion of

Uganda's rural energy strategy (as developed by the Rural Energy Agency), and a key role in helping promote and approve investments in rural energy funded by the Rural Energy Fund (REF);

- **Formalize Working Relations with all Key ERT Agencies:** MOLG headquarters' staff should become completely familiar with all aspects of the ERT. They should set up formal working relations on the ERT with other key stakeholders (additional to the REB), particularly with the Private Sector Foundation (PSF), the REA itself, the Ministry of Energy and Mineral Development (MEMD), and the Ministries of Health, Education, Agriculture and Water;
- **Regional Seminars and Workshops:** Once the MOLG has become fully familiar with the ERT and its range of operations, it should initiate a series of regional seminar that bring together all district local government leaders (political at the LCV level and administrative, see below). These regional workshops will be organized in conjunction with the PSF, the REA and the MEMD to ensure maximum cooperation, and the participation of these stakeholders in familiarizing local authorities on the objectives of, and opportunities presented by, the ERT.
- **Promotion, Dissemination, Public Awareness:** The MOLG, working particularly closely with the REA, should help the REA develop a series of promotional and public awareness packages, including investor support packages, that can be channeled through local authorities to promote ERT activities and investments at local level. MOLG should liaise with the PSF to ensure that promotional and dissemination programs are coordinated and the local authorities cooperate and assist the PSF in its private sector activities.

## Implementation structure

MOLG will be responsible for arranging and implementing the workshops, for organizing and overseeing consultancies as set out in the work program, and for specific implementation details set out below. The MOLG will undertake to raise the level of awareness of its key staff and personnel to promote the objectives of the ERT. It will sit on the Rural Energy Board to advocate the interests of local authorities and to promote projects and ideas generated there. The MOLG will work with the REA, the PSF, the MEMD and other key stakeholders to promote the ERT at all levels, and specifically to encourage the development of local environments that promote and facilitate local investment.

The MOLG will be responsible for preparing the TOR for its information packages in conjunction with the REA and the PSF. It will be responsible for preparing the TOR and contacting the services for follow on and monitoring of local authority participation in, understanding of, and promotion of the ERT. It will be primarily responsible for organizing a series of key initial regional workshops to familiarize key stakeholders, and then, two years later, to hold further workshops to update local authorities on progress of the ERT, to gain a better understanding of how successful the MOLG's (and other key stakeholders') approaches have been and to recommend steps to improve delivery of ERT information and services.

The regional workshops will be of key importance. The MOLG will prepare a summary of main points of the overall ERT program to be given to participants at the workshops. MOLG should collaborate with the concerned ministries who will be responsible for giving a summary of the main points of their components to be included in the ERT summary report. This content should be agreed upon with the ERT team who will give assistance in the form of comments on draft documents.

There are many different stakeholders in the workshop and therefore many speakers. The MOLG will be hosting and chairing the workshop and the team for each work shop can be seen below. Invitations will go out from MOLG no later than two months before the workshop are to take place.



The MOLG will appoint a focal point person, who will be provided under the ERT with the telecommunications equipment and services (mainly computer with email and WWW services) to work and liaise with his/her counterparts in the field. The MOLG ERT focal point person will organize the Internal MOLG Workshop, and prepare the materials, and invite the key stakeholders necessary to make this a success. She/h will be primarily responsible coordinating the technical assistance under this component, for ensuring the technical advisers are plugged into the right national and local level personnel, and that they have access to all the necessary information and contacts.

The focal point person will also be primarily responsible for organizing the regional workshops, writing up reports on these, and coordinating the follow up and monitoring of these activities. She/he will work with MOLG ERT consultants on the information packages, and will liaise closely with counterparts in the REA (particularly the Information and Promotion Service) and the PSF.

## Technical Assistance

The main activities under the MOLG TA package, in addition to liaising with all key ERT stakeholders at a national level, is to promote close the project and close cooperation at a local, operational level (e.g., with PSF, REA, MEMD, etc.). The MOLG is uniquely placed amongst all key national stakeholders to facilitate the introduction of the ERT at a local authority level, and help facilitate the entrée of the PSF, the REA and other key agents in the ERT at local levels. Several distinct levels of activity are planned during the project.

1. Activity 1 - MOLG Internal Workshop
2. Activity 2 - Information, Promotion and Dissemination Packages
3. Activity 3 - Follow-up Regional Workshops
4. Activity 4 - Follow Up and Reporting

**Table 5.3 Cost estimates of TA for the promotion of Rural Electrification**

Activity	Description	TA (disbursement)	Year 1	Year 2	Year 3	Year 4	Total
<b>Communications Support</b>	MOLG communications requirements	Operational	\$ 3,330	\$ 1,080	\$ 1,080	\$ 1,080	\$ 6,570
<b>1</b>	MOLG Internal Workshop	Consultant	\$ -	\$ -	\$ -	\$ -	\$ -
		Operational	\$ 1,850	\$ -	\$ -	\$ -	\$ 1,850
	<b>Sub-total</b>		<b>\$ 1,850</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 1,850</b>
<b>2</b>	Information package	Consultant	\$ 14,300	\$ 5,000	\$ 5,000	\$ 5,000	\$ 29,300
		Operational	\$ 100,000	\$ 92,000	\$ 92,000	\$ 92,000	\$ 376,000
	<b>Sub-total</b>		<b>\$ 114,300</b>	<b>\$ 97,000</b>	<b>\$ 97,000</b>	<b>\$ 97,000</b>	<b>\$ 405,300</b>
<b>3</b>	Regional Workshops	Consultant	\$ 13,400	\$ -	\$ -	\$ -	\$ 13,400
		Operational	\$ 112,240	\$ -	\$ -	\$ -	\$ 112,240
	<b>Sub-total</b>		<b>\$ 125,640</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 125,640</b>
<b>4</b>	Follow up	Consultant	\$ -	\$ 13,867	\$ 13,867	\$ 13,867	\$

	activities						41,600
		Operational	\$ -	\$ 2,533	\$ 113,573	\$ 2,533	\$ 118,640
	<b>Sub-total</b>		\$ -	\$ 16,400	\$ 127,440	\$ 16,400	\$ 160,240
<b>Total</b>			\$ 245,120	\$ 114,480	\$ 225,520	\$ 114,480	\$ 699,600

#### **Project Component 6 - US\$12.50 million**

##### **Information and Communication Technologies (ICTs)**

This component will be implemented by the Uganda Communications Commission (UCC), though all the investments will be undertaken by private sector firms.

The project will finance both investment and technical assistance. The investment support will be in the form of subsidies to private operators who would bid for subsidies to undertake service obligations in commercially nonviable rural areas, with three objectives: (a) accelerated access to voice telephony, (b) internet access at District Headquarters, and (c) rural telecenters at 'vanguard institutions' (including schools and hospitals, as well as associations of farmers and micro-entrepreneurs) outside District Headquarters in selected Districts.

Specific safeguards have been included in the project design to ensure that the bidding for the investment projects by the private sector takes place in an effective and transparent manner: (a) decisions relating to the rural program will be taken by the RCDF Board of Trustees that will operate at arm's length from UCC (which itself operates at arm's length from the Ministry of Communications); (b) international consultants will be hired to assist at the critical stages of the contracting process, notably the organization of the bidding process, the evaluation of bids and the certification of investment requirements; and (c) subsidy payments for the rural investments will be disbursed directly from the World Bank to the rural operators against audited fulfillment of the investment targets.

The technical assistance will support UCC with the implementation of the investment sub-component, so as to ensure that the design of the rural projects is in line with international best practice. Specifically, the TA will finance: (a) specification and bidding of the rural service licenses, (b) an international adviser on rural ICT, (c) verification of the required investments, and (d) training of UCC.

##### **Background - ICTs**

Leaders around the world are increasingly recognizing the potential of Information and Communication Technologies (ICT) as a tool for promoting economic and social development in Africa. In a continent as vast and sparsely populated as Africa, ICT helps to reduce isolation by providing an immediate link with the modern world and accelerate development by 'leapfrogging' many of the traditional stages. The range of applications is very broad, encompassing initiatives to improve the quality of education and healthcare, to provide farmers and entrepreneurs with access to market information and to improve the efficiency and transparency of public administration.



***Mobile telephone service is spreading rapidly across urban Uganda and district capitals, but rural areas are lagging behind in all forms of telecommunications access.***

The importance of ICT in the development process has been emphasized by the G8 Digital Opportunities Task Force (DOT Force) in its recent Genoa Plan of Action:

*When wisely applied, ICT offer enormous opportunities to narrow social and economic inequalities and support sustainable local wealth creation, and thus help to achieve the broader development goals that the international community has set. ICT cannot of course act as a panacea for all development problems, but by dramatically improving communication and exchange of information, they can create powerful social and economic networks, which in turn provide the basis for major advances in development. By enabling these new networks to collect and share local knowledge and information, ICT can provide new and more efficient methods of production, bring previously unattainable markets within the reach of local producers, improve the delivery of government services, and increase access to basic social goods and services.*

**Uganda fully recognizes the potential development contribution of ICT.** President Museveni has taken a keen interest in ICT since the mid-1990s and has a vision of Uganda as a leading ICT country within Africa and a potential hub for electronic commerce. At the Global Knowledge Conference held in Toronto in 1997, he called upon the international community to assist Uganda in harnessing ICT for development purposes.

As a result of the recent growth in telephone lines following on sector reform, Uganda has reached a **national teledensity of about 1 telephone per 100 population**, when both fixed and cellular lines are taken into account. This puts Uganda above the average teledensity for Sub-Saharan Africa (excluding South Africa) which stood at 0.60 in 1999. However, the majority of these lines are concentrated in the Kampala area, so that teledensity in rural areas is substantially lower. By July 2001, it is expected that only 380 out of the 920 sub-counties in Uganda will have telephone service.

The market for **Internet access in Uganda is competitive but currently small** with some 6,000 subscribers and six principal Internet Service Providers (ISP), the two largest of which are Infocom and Africa Online with 4,000 and 1,500 customers respectively. ISP services are currently limited to the Kampala area due to the absence of Points of Presence elsewhere in the country. However, AFSAT

provides satellite based access to corporate clients throughout the country, while Bushnet provides HF Radio based email accounts for users in remote rural areas. Commercial cyber cafés have become commonplace in Kampala, but are virtually unheard of in rural areas. The cost of Internet access at these establishments has been coming down and is currently U.Sh.50 per minute (equivalent to US\$1.80 per hour).

### ***Policy-making***

The responsibility for policy formulation in the ICT sector is divided between the Ministry of Transport, Communications and Works with responsibility for telecommunications and the Ministry of Information with responsibility for information and the media. The task of developing an ICT policy has been delegated to the Uganda National Council for Science and Technology (UNCST), a parastatal organization formed in 1994 with a mandate to coordinate the formulation and management of explicit national policies in the field of science and technology. UNCST has already published a discussion paper *Strategy for Developing A National Information and Communication Technology (ICT) Policy for Uganda*, and is now drafting a policy document.

Another important initiative in the area of ICT policy formulation is the World Bank sponsored INFODEV project: Information Infrastructure Agenda Project. This project has financed a program of fieldwork with stakeholders in a variety of sectors with important ICT applications (health, education, agriculture, enterprise, government) with a view to drafting a 'grey paper' with concrete policy proposals and identifying a number of projects for downstream funding. The 'grey paper' will become available by mid-2001.

### ***Sector reform***

The GOU has recently undertaken substantial and **successful structural reforms** in the telecommunications sector, with WB assistance under the recently completed 'Enterprise Development' Technical Assistance Loan (Number 23150). The 1997 Uganda Communications Act provided for the incorporation and privatization of Uganda Telecommunications Limited (UTL), and required the introduction of competition in basic telecommunications service provision, initially through a licensed duopoly with a 'dual' exclusivity period running through until July 2005. In 1998, a license was awarded to MTN Uganda to become the country's second national operator.

The 1997 Act also led to the creation the Uganda Communications Commission (UCC) as the regulatory agency charged with licensing and monitoring the ICT sector. In order to ensure an arm's length relationship vis-a-vis the Executive branch, the governing body of the Uganda Communications Commission (UCC) is a commission comprising six members plus an Executive Director. The six members are appointed by the Minister of Communication on approval by cabinet; three of them on the basis of the recommendations made by the Institution of Professional Engineers, the Uganda Law Society and the Broadcasting Council. At present, the members of the commission are all private citizens (with the exception of the representative from the Broadcasting Council) and include one engineer, one lawyer, an academic, and two business people. The commissioners hold office for a period of three years, while the Executive Director holds a five year term. Both may be re-appointed.

An integral element of the sector reform is the focus on improving access in rural areas. Thus, the licenses of the two national operators incorporate significant 'rollout' obligations. UTL is committed to providing 100,000 new land lines by July 2005, of which 30,000 must be rural and 3,000 must be public telephones. MTN Uganda has a minimum target of nearly 88,000 lines over the same period, of which 2,000 must be

public telephones. Furthermore, both operators are required to have a presence in every county in the exclusivity area.

However, in recognition that telephone services would not necessarily be commercially viable in all parts of the country, the two operators were given one year since the start of the exclusivity period (that is from July 2000 to July 2001) to declare which of the country's 931 sub-counties they do and do not wish to serve. In the counties they wish to serve, they will be required to provide at least one telephone line by July 2002. While in the remaining sub-counties the two national operators have effectively forfeited their exclusivity, and responsibility for licensing services has reverted to the UCC.

In line with international best practice, the UCC plans to competitively tender the provision of ICT infrastructure in unserved areas to private sector operators using the minimum subsidy concession vehicle pioneered in Chile since 1995 and subsequently adopted in many other countries (Colombia, Peru, Guatemala, Nicaragua, Nepal, South Africa). Under this approach, the government defines a rural service contract with associated obligations, and private operators bid in terms of the investment subsidy they would require in order to take on the obligations. The contract is awarded to the operator requesting the minimum subsidy. The subsidy required to induce private operators to enter the rural market will be financed through the Rural Communications Development Fund.

**Rural Communications Development Fund.** The 1997 Uganda Communications Act provided for the establishment of a Rural Communications Development Fund (RCDF), intended to serve as a mechanism for financing the achievement of universal service objectives in areas not considered to be commercially viable by the private sector. The main source of revenue into the fund is the Universal Service Levy (USL), which is levied on the turnover of the telecommunications and postal sectors, although the fund may also receive contributions from multilateral and bilateral agencies. By law the USL can be up to 2.5% of gross operator revenues (excluding sale of equipment). In the year 2000 the Minister of Communications chose to set the USL at 1% of gross revenues. The RCDF may also receive contributions from bilateral and multilateral agencies.

In order to ensure that the RCDF is administered at arm's length from the commission itself, the UCC will create an RCDF Board to be responsible for day-to-day management. The Board will comprise five voting members: the Executive Director of UCC and one additional UCC Commissioner, plus three private citizens representing the communications sector, the financial sector and a recognized consumers' association. The Ministry of Communications will provide a sixth ex officio board member without voting rights. The members of the RCDF Board of Trustees will be appointed by the UCC under terms and conditions still to be determined. The RCDF Board of Trustees will have the final say in all matters relating to the rural fund, but will be accountable for its actions to the UCC commission and will discharge its duties in line with the policies and procedures to be established by UCC.

### ***Donor-sponsored telecenters***

One of the nine key action points identified by the G8 DOT Force was to 'improve connectivity, increase access and lower costs'. The establishment of public and community ICT access points in post offices, schools, and community centers, is seen as a key means of facilitating such access; particularly in rural and remote areas. However, the DOT Force stresses the need to provide a combined package of access and training.

In Uganda, a number of donor organizations have been active in supporting the development of MCTs or public access internet facilities, in parallel with the expansion of commercially based ICT services. Around

25 telecenters have been established since 1997, primarily in urban and peri-urban areas. Most of these have been located in secondary schools for educational purposes, however there are also a number of community centers as well as hospital-based telemedicine facilities. A further 20 telecenters are currently in the pipeline, the majority of which will be sited in rural areas.

Experience with commercial sustainability has been mixed. Multi-purpose community centers have had difficulties in becoming financially self-sustaining, with the Nabweru and Buwama centers running deficits of US\$750 per month. However, school-based telecenters - at least in urban areas - do not appear to have had any great difficulty in becoming self-sustaining, because of their ability to cover costs by placing a surcharge on school fees. A typical urban secondary school can raise around US\$1,400 per month from a contribution of (of the order of US\$5 per student per term). The smaller size and lower fee structure of rural schools will make sustainability more challenging, and probably entail the sharing of facilities between schools and other users.

### **Rural demand for and benefits from ICT services**

**Rural demand seems to be primarily for voice telephony services, and to a much more limited extent for fax.** General awareness and understanding of email and Internet services in rural areas is very low, however there is growing interest from a relatively small number of more sophisticated business men, public servants or teachers who have been exposed to the technology during visits to Kampala.

The UCC recently commissioned a consultant to define a rural communications strategy, and in particular to conduct detailed empirical research on rural demand for telecommunications services. Regarding public telephones, around 50% of households interviewed declared that they would make regular telephone calls if the service was available, and about half of these had already had experience of making telephone calls. Based on survey results and international experience, it is estimated that rural households would spend 1%-2% of their income on telephone calls, spending around U.Sh.2,000-5,000 (or \$1.40 to \$2.80) per month on between 2 and 5 telephone calls. Households currently making calls tend to pay as much as U.Sh.1,000 (or US\$0.55) per minute to make telephone calls from 'informal' public telephones. These charges represent a mark-up of around 400% over MTN rates), and provide clear empirical evidence of the extent to which households value ICT services. The household survey suggests that most people would be willing to pay around U.Sh. 300-400 (or US\$ 0.17 to US\$0.22) per minute.

Regarding private telephone subscriptions, the consultant estimates the potential for between 0.5 to 0.7 subscriptions per 100 inhabitants, coming primarily from traders and retailers, large farmers, headmasters and some teachers, health sector staff, and public administrators, as well as NGO and church organizations.

### **Benefits of ICT in rural Uganda**

The most **direct benefit** of improved telecommunications is the fact that people would no longer need to spend considerable amount of time and money on journeys that could be avoided were affordable and reliable infrastructure in place. These are journeys made purely for the purpose of relaying messages and documents to persons in distant locations, and which moreover are often wasted due to the difficulty of coordinating ahead of time with the intended recipient of the message. However, given impossibility of making remote financial transactions and the lack of trust in delivery services, some of these journeys would still have to be made even if adequate ICT services were available.

**Anecdotal evidence from Kisiizi.** Kisiizi Hospital is located in southwest Uganda, some 400 kilometers

from Kampala. After repeated fruitless attempts to secure a telephone connection from the national provider, the hospital resorted to installing its own satellite telephone. However, satellite charges are high at \$2.50 per minute, or more than 10 times the rate offered by the public telephone company. Given that a round-trip bus fare to Kampala costs \$12.50, it becomes cheaper to travel to the capital than to make a six minute phone call. Thus, for example, a nurse who needed to know the date and duration of a training course she was going to attend gave up after being put on hold for 10 minutes. Instead, she took the next 4 am bus service, which after an uncomfortable six hour ride delivered her to Kampala where she was able to register for the course.

The **indirect benefits** of improved access to ICT are more subtle and difficult to quantify, yet are potentially much more important than the direct benefits. They relate to the fact that the community would be able to initiate many valuable interactions with the outside world that simply fail to take place at the moment, due to the prohibitive cost and logistical complexity of current communication options. These indirect benefits are very wide ranging but include improved commercial opportunities for farmers and entrepreneurs who would be able to connect with buyers in distant markets, improved educational opportunities to children who would be able to secure access to modern teaching materials, improved health opportunities to patients who would be able to secure access to specialist medical attention. Last but not least, the isolation of rural communities makes it very difficult for them to attract and retain high quality professionals to staff health and educational services. Improved communications could have a significant impact on this problem.

**Potential beneficiaries.** These direct and indirect benefits are relevant to a number of different stakeholder groups in rural communities.

- **Public institutions.** *District Authorities* need to be in regular communication both with Kampala and with lower level authorities (county and sub-county level). In the absence of ICT services this necessitates numerous journeys, some of which could be avoided by improved communications. For example, following the introduction of MTN services, Nebbi District Authority reported cost savings of \$7,000 per month by avoiding, on average, 30 trips to Kampala (costing \$200 each) and 50 trips to county offices (costing \$50 each) - quite significant since travel absorbs 45% of the total District budget. *Hospitals* need to communicate with their referral hospital to coordinate treatment of patients and with Entebbe to order supplies and liaise with the Ministry of Health. Doctors also need to keep up to date with the latest medical treatments. For *schools*, communication is primarily an educational tool which brings access to up-to-date information and teaching materials. It also opens the potential of distance learning arrangements.
- **Private businesses and farmers.** Most *small business owners* (e.g. retailers) need to make weekly trips to Kampala in order to obtain stock, some of which would be avoided with improved communications. Many *agro-processing businesses* are engaged in export of timber, coffee, cotton and other products with neighboring countries (Congo, Kenya and Sudan). Some timber is even exported to the Persian Gulf. These businesses would benefit from improved communications to facilitate the logistics of export. *Farmers* need information about the prices of crops, without which they are vulnerable to exploitation by middle men. They also need to market their services for export. Finally, farmers need to learn about improved agricultural techniques and alternative crops which they might cultivate.
- **Households.** Many local families have relatives living far away. One such group are school children who board in Kampala or elsewhere in the country. Another such group are emigrants living in Europe, North America or Japan.

## Role of RCDF and UCC

The UCC has already identified a broad range of rural access initiatives that will be supported through the RCDF, including universal access to voice telephony, extension of Internet access to rural areas, capacity building for the use of ICT, promotion of ICT content creation and the creation of a national Internet Exchange Point. The following three objectives have been accorded the highest priority.

**Objective A: Universal access to voice telephony.** Defined as the provision of at least one public telephone per 5,000 inhabitants at the sub-county level, throughout Uganda. Given that the average population of a sub-county is around 20,000 people, this is equivalent to 4 telephones per sub-county. Moreover, given that sub-counties typically represent an area 10km in radius, the achievement of this objective would put most of the population within 5km of a telephone. Attention would initially focus on placing at least one public telephone in the 156 sub-counties that were declared commercially non-viable by both national operators as of July 2001. Additional investments may also ultimately be required to reach this same level of public telephone density in other regions of the country, given that under the terms of their licenses the two national operators are only required to provide one public telephone per county as opposed to one per sub-county.

This definition of universal access is consistent with what is found in other countries. In Peru the rural telecommunications fund seeks to provide a service to all villages with more than 500 inhabitants, which is equivalent to saying a maximum distance of 5 kilometers to the nearest telephone. In Nepal, the government's target of at least 2 lines per Village Development Committee area would ensure on average one telephone per 2,700 inhabitants, or a maximum distance of 3.2 kilometers to the nearest telephone.

These access requirements could be met by extending the GSM network, in which case the infrastructure required to support the proposed network of public telephones would also permit private use of mobile telephones and hence the basis for entrepreneurs to establish additional public access telephones in retail outlets or kiosks. A cheaper alternative, in terms of investment costs, would be to develop a VSAT network around a central hub servicing a number of local terminals. However, this would only provide service at the specific location of the terminal, although it might be possible to provide wireless links to other telephones nearby. Operating costs might also be expected to be higher unless scale economies can be reaped by sharing a given satellite space segment over a large number of terminals.

**Objective B: Internet access at District Headquarters.** Defined as the creation of Internet Points of Presence (POP) in each of the 56 District Headquarters, together with a public Internet access facility. The aim is to ensure that Internet users in all District Headquarters have reliable access to the Internet at affordable (local call) rates. The Internet POP would need to be supported by a communication line of adequate bandwidth to support Internet access at acceptable speeds (for example 56Kbps). This fulfillment of this objective would represent a very substantial improvement in national Internet access relative to the status quo. In an initial stage, service will be provided in 30 of the 56 District Headquarters.

**Objective C: Rollout of rural multipurpose community telecenters (MCTs).** Defined as the creation and maintenance of at least one rural MCT per District located at a 'vanguard institution' outside of the District Headquarters. 'Vanguard institutions' are defined as those with a demonstrated potential to benefit economically and/or socially from Internet access. They include schools (secondary schools, vocational colleges, teacher training centers) and hospitals, as well as associations of farmers and small business men. Given the limited experience with rural MCTs, the initial objective is to support the creation of pilot MCTs



to experiment with alternative institutional models and evaluate the sustainability of the approach. It will be important to ensure that these telecenter projects incorporate complementary activities to train the local community and develop locally relevant applications.

**Estimated subsidy requirement.** The subsidy cost of meeting the initial stage of Objectives A-C described above is estimated at US\$5.8 million. The breakdown of this is as follows (a) US\$4.5 million for the provision of at least one public telephone in 230 unserved sub-counties, (b) \$0.8 million for the provision of Internet access in 30 District Headquarters, and (c) \$0.5 million for rural MCTs.

These estimates are based on the assumption that 50% of the total investment cost will need to be subsidized. Until the bidding process is conducted, this parameter cannot be known. Experience in the Latin American region, suggests that \$1 of public subsidy attracts between \$2 and \$6 of private capital. However in Nepal, a country that has recently begun to apply this approach, the private operators requested subsidies equivalent to 100% of the investment costs. *Bearing in mind the differences in operating environment between these countries and Uganda, it seems reasonable to adopt an estimate of 50%.*

**Table 6.3: Estimated costs and subsidies**

	No. of sites (#)	Unit cost (US\$)	Total investment (base case) (US\$m)	Total subsidy (base case) (US\$m)
Universal access to voice telephony	156 sub-counties		9.0	4.5
* Global coverage	98 sub-counties	83,000	8.1	
* Point coverage	58 sub-counties	15,000	0.9	
Internet access at District HQ	30 Districts	50,000	1.5	0.8
Rollout of rural MCTs	7 Districts	70,000	0.5	0.5
Total			12.0	5.8

*Assumptions.:* (a) Two thirds of sub-counties would receive point coverage (eg. VSAT) and one third would receive global coverage (eg. GSM). (b) One GSM base station costs \$250,000 and serves 3 sub-counties. (c) One VSAT station costs \$15,000 plus a hub of \$1,000,000. (d) One \$ of subsidy is required for every \$ of private investment in ICT infrastructure.

**Need for IDA support.** The RCDF will take some time to accumulate the levels of finance required to meet the objectives described above. At present, the RCDF has a balance of US\$0.4 million due to the UCC's voluntary decision to allocate revenues received from the license fees of the major operators into the RCDF. By law, these revenues could have been used to contribute to the operating expenditures of the UCC.

The USL applies to all operators from the year 2001/02 onwards, but due to license specifications applies retroactively to MTN for the years 1998/99 and 2000/01. The USL charge for MTN for 1998/99 has already been invoiced, while the charge for 2000/01 is in the process of determination. For a number of reasons, there is a significant lag in the collection of the USL. First, the charge must be based on audited accounts which do not become available until six months after the end of the corresponding financial year

(which varies by operator). Second, by law, operators are allowed to pay a given year's USL charge in quarterly installments. Third, operators have up to two months to pay the USL charge after the issuing of the invoice. For these reasons a lag time of one full year needs to be taken into account in estimating USL revenues.

Based on continued 5% annual growth rates for GDP and the assumption that the ICT sector will gradually increase its share of GDP, it is possible to project the revenues likely to accrue to the RCDF. These are expected to be of the order of US\$1-2 million each year from 2002/03 onwards. On this basis, the estimated subsidy required to meet the three priority objectives defined above could not be expected to accumulate in the RCDF before the year 2005. *On this basis, IDA seed-financing of US\$5 million would lead to a significant acceleration of rural access.*

**Table 6.4: Projected revenues of the RCDF**

	00/01	01/02	02/03	03/04
Telecommunications as % GDP	1.1%	1.3%	1.8%	2.6%
GDP (growing at 5% pa.)	7,590	7,970	8368	8,786
Telecommunications market	83	108	155	226
Initial endowment US\$ m	0.4			
1% Universal Service Levy US\$ m		0.5	1.4	1.5
Cumulative balance of RCDF US\$ m	0.4	0.9	2.3	3.8

The ICT sector component will finance both investment and technical assistance.

### ***Investment***

This sub-component will be used to provide finance for the payment of investment subsidies to private operators willing to take on service obligations in commercially nonviable rural areas. The investment sub-component will take a value of US\$5 million in APL Phase 1. These funds will be used to support the achievement of the three priority Objectives A-C identified above. Since it will probably not be possible to meet these three objective in full during APL Phase 1, minimum targets have been set for Phase 1 of the project (see Table 6.5).

- **Objective A: Universal access to voice telephony (APL Phase 1).** To provide at least one public telephone per sub-county in all 156 sub-counties that were declared uncovered by both national operators in July 2001. Some 30 Districts are expected to benefit, primarily from the northern and eastern regions of the country. The overall project objective will be met in Phase 2 by (a) if necessary, increasing the density of public telephones in sub-counties uncovered by both national operators to one per 5,000 inhabitants; and (b) increasing the density of public telephones in all other sub-counties to one per 5,000 inhabitants.
- **Objective B: Internet access at District Headquarters (APL Phase 1).** To provide Internet Points of Presence and public access facilities to at least 30 District Headquarters. The selected Districts must meet at least one of the following criteria: (a) the District does not include any sub-counties that are uncovered by both national operators in July 2001; and (b) the District has the basic telecommunications infrastructure required to support the creation of the POP. The Districts expected to benefit are those which do not appear in Table 6.2. Any remaining Districts would be reached during the course of Phase 2.
- **Objective C: Rollout of rural MCTs (APL Phase 1).** To provide rural telecenters at 'vanguard institutions' (including schools and hospitals, as well as associations of farmers and micro-entrepreneurs) outside District Headquarters in seven selected Districts. The selected 'vanguard institutions' must meet the following criteria: (a) there must be at least one telecenter in each of the education, health, agricultural and microenterprise sectors, across districts; (b) the host institution must have a clear objective for the use of the Internet and a demonstrated ability to

finance the operating and maintenance costs of the telecenter; and (c) for reasons of coordination with Phase 1 ERT rural electrification projects, the Phase 1 rural MCTs will include one at Kisiizi Hospital in Rukungiri District (see below) and one aimed at meeting the needs of the agricultural community in Paidha (Nebbi District). The remaining Districts will receive these services in Phase 2.

**Table 6.5: Project objectives and their phasing**

	Objective A	Objective B	Objective C
Project objective	One public telephone per 5,000 inhabitants in all sub-counties nationwide.	Internet POPs and public Internet access facilities in each of 56 District Headquarters	Establishment of at least one rural MCT per District in 'vanguard institutions' outside of the District Headquarters.
Phase I objective	At least one public telephone per sub-county, in all 156 sub-counties that were left uncovered by both operators in July 2001.	At least 30 POPs and public Internet access facilities at District Headquarters.	At least seven rural MCTs in 'vanguard institutions'.
Phase II objective	Completion of the project objective.	Completion of the project objective.	Completion of the project objective.

## Technical Assistance

The TA sub-component is designed to support UCC with the implementation of the investment sub-component, so as to ensure that the design of the rural projects is in line with international best practice and that the tendering process is conducted in a transparent and arm's length manner. The TA sub-component will take a total value of US\$500,000 in Phase 1 of the project, and will be used to finance the following activities.

- **Specification and bidding of the rural service licenses (US\$300,000).** In order to translate the three overall Objectives A-C into concrete projects that can be tendered to the private sector, a significant amount of additional groundwork is required. The first stage will be to develop the detailed technical, financial and regulatory specification for the licenses required to deliver the identified objectives. The specification should cover all aspects of the licenses including geographical extension, type of service, quality of service, duration of contract, tariff arrangements, quality of service parameters, payment vehicles and marketing arrangements. Critically, it will also include an estimate of the required investment subsidy for each concession which will be used as a reference level in the bidding process. The second stage will be to undertake all of the activities required to select private sector operator(s) to provide the services required to meet the Phase 1 objectives. This will include the drafting of bidding documents and the overall management of the bidding process.
- **International adviser on rural ICT (US\$80,000)** Although already in widespread use in Latin America, the minimum subsidy tender approach for rural ICT services has not as yet been applied in Africa. It is therefore desirable that the executing agency should have access to high quality advice from an international specialist with direct experience of implementing this approach in other countries. This element of the TA will be used to provide for the retention of a high caliber international specialist. The consultant will visit the UCC at critical stages in the project to review progress on implementation and make recommendations on key issues. In between visits, the

consultant will provide on-going support on a long distance basis, being available to answer questions, discuss issues and review project documents.

- **Verification of the required investments** (US\$40,000) The payment of the investment subsidy to the licensed rural operator will be contingent upon the satisfactory execution of the investment requirements identified in the rural license. Since the RCDF and the rural operator are both parties to the subsidy contract, it is necessary to provide for independent third party certification that the required investments have been executed so that the subsidy payment can go ahead. This element of the TA will be used to cover the cost of a local consulting engineer to perform field visits to the project sites and provide certification of the investments.
- **Monitoring of quality of service** (\$70,000) Given the geographical dispersion of the rural ICT facilities, the monitoring of the quality of service provided by rural operators will require substantial effort. This activity provides resources to contract out the bulk of the monitoring and enforcement activities to a private agent that will be charged with making periodic random site visits to evaluate the performance of the rural operators.
- **Training of UCC** (US\$10,000) As well as supporting the executing agency with the provision of international consultants, it will be important to ensure that the agency itself builds capacity and know-how in the design and tendering of rural ICT projects. Some finance has therefore been set aside to finance training activities, primarily attendance at international seminars and training events on the topic of rural access.

### **Pilot MCT at Kisiizi Hospital**

Kisiizi Hospital is located in Rukungiri District in southwest Uganda. The site is some 400 kilometers from Kampala and half way between the two district capitals of Kabale and Rukungiri, each about 45 kilometers away. The hospital, which is a Church of Uganda foundation, has been in operation since the 1960s and serves a catchment area of around 147,000 people. Adjacent to the hospital is a small trading center where about 20 small retail outlets have sprung-up, and local farmers congregate to sell their produce once per week. Some 10 km north of the hospital are the Sub-County administrative headquarters for local government. Within 16 kilometers of the hospital there are eight secondary and/or vocational schools each of which has around 200 students, i.e., a total of around 1,600 students.

The purpose of this project is to address the telecommunication problems of the Kisiizi community by constructing an MCT facility. The telecenter would include four components targeted at different user groups within the community:

- **Public Communications Center** targeted at the general public, entrepreneurs and farmers, as well as hospital staff, patients and their relatives. The center would provide public access to a telephone with messaging service, a fax machine and a computer and printer with electronic mail and internet connection.
- **Educational Computer Laboratory** targeted at local secondary schools and vocational colleges. The laboratory would provide local secondary schools and vocational colleges with a shared computer and internet facility. All participating schools would be allocated a certain number of hours per week to use the facility.
- **Telemedicine Facility** targeted at the needs of medical practitioners at the hospital. The facility would be designed to support a 'store and forward' teleconsultation facility which makes it possible for doctors at the hospital to consult specialists in other locations about the problems

faced by specific patients, by means of electronic mail with attached files containing digitized reproductions of X-rays, pathology data, microscope slides, electrocardiogram output etc.

- **Community radio station** targeted at people living in the isolated hinterland will not be able to visit the telecenter as frequently as those in the immediate Kisiizi area. In this sense, the community radio station provides a valuable complement to the telecenter, since it provides a secondary distribution network, through which information of relevance to the community can be more widely disseminated at low additional cost.

The value of the physical installations described above to the Kisiizi community will depend on which the community is enabled to put the technology to productive uses. Given that this technology is new and unfamiliar to most people in the community, a project that simply puts the hardware in place is unlikely to be successful in reaping the development benefits of the investment. For this reason, the Kisiizi telecenter project would incorporate a program of activities designed to train different user groups within the community and provide them with internet applications which are of direct benefit to them. A number of institutions in Uganda are already active in developing local internet content and applications. These institutions have agreed to collaborate with the project, providing a solid basis for programs to benefit users in the education, health, agriculture and microenterprise sectors.

**Annex 3: Estimated Project Costs**  
**UGANDA: Energy for Rural Transformation Project**

**APL I**

<b>Project Cost By Component</b>	<b>Local US \$million</b>	<b>Foreign US \$million</b>	<b>Total US \$million</b>
Component 1- Main Grid Related Power Distribution & Generation	12.45	33.10	45.55
Component 2 - Independent Grid Systems	8.81	17.33	26.13
Component 3 - Solar PV Systems	-	10.80	10.80
Component 4 - Cross Sectoral	6.25	7.19	13.44
Component 5 - Capacity Building, Technical Assistance, Training	8.05	6.73	14.78
Component 6 - ICT	0.80	5.00	5.80
<b>Total Baseline Cost</b>			
<b>Physical Contingencies</b>	-	-	-
<b>Price Contingencies</b>	-	-	-
<b>Total Project Costs</b>	39.26	83.94	123.20
<b>Total Financing Required</b>	39.26	83.94	123.20

<b>Project Cost By Category</b>	<b>Local US \$million</b>	<b>Foreign US \$million</b>	<b>Total US \$million</b>
<b>Goods</b>	2.24	72.74	74.98
<b>Works</b>	26.52	4.12	30.64
<b>Services</b>	10.50	8.08	18.58
<b>Training</b>	-	-	-
<b>Total Project Costs</b>	39.26	84.94	124.20
<b>Total Financing Required</b>	39.26	84.94	124.20

<sup>1</sup> Identifiable taxes and duties are 0 (US\$m) and the total project cost, net of taxes, is 393 (US\$m). Therefore, the project cost sharing ratio is 38.17% of total project cost net of taxes.

## **Annex 4**

### **UGANDA: Energy for Rural Transformation Project**

A conventional cost-benefit analysis exercise with NPV and ERR has not been undertaken for APL1, but will be undertaken for APL2. See section E in the main text for details; in brief, at present, it is not feasible to derive robust estimates of economic benefits for two reasons:

- In Uganda, in the absence of any meaningful experience with rural electrification, estimates of consumer's surplus would require not only extensive primary data collection but also the use of sophisticated econometric techniques, such as contingent valuation methods. Given the high costs of the effort and the likely speculative nature of the results, it was decided not to undertake this exercise during project preparation.
- Further, in the absence of any significant experience with rural electrification in Uganda, and none with cross-sectoral links, it is difficult, at this time, to obtain reliable estimates of two key elements of economic benefits: the consumer's surplus and the indirect benefits. These tasks will be undertaken as part of the monitoring and evaluation of the project during Phase 1, building on the analysis now being carried out in an ESMAP-funded study to develop and implement - for the Philippines - a benefit assessment method designed to improve valuation of benefits from rural electrification.

In the interim, some assurance is provided by preliminary results from the forthcoming ESMAP study show that in the Philippines potential economic benefits from rural electrification are much higher than the benefits measured by financial revenues, and far exceed the costs of rural electrification.



**Annex 5: Financial Summary**  
**UGANDA: Energy for Rural Transformation Project**  
**Years Ending**

IMPLEMENTATION PERIOD							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
<b>Total Financing Required</b>							
<b>Project Costs</b>							
Investment Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recurrent Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total Project Costs</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total Financing</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Financing</b>							
IBRD/IDA	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Government	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Central	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Provincial	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Co-financiers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
User Fees/Beneficiaries	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total Project Financing</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OPERATIONAL PERIOD							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
<b>Total Financing Required</b>							
<b>Project Costs</b>							
Investment Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recurrent Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total Project Costs</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total Financing</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Financing</b>							
IBRD/IDA	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Government	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Central	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Provincial	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Co-financiers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
User Fees/Beneficiaries	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total Project Financing</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Main assumptions:**



## **Annex 6: Procurement and Disbursement Arrangements**

### **UGANDA: Energy for Rural Transformation Project**

#### **Procurement**

##### **General**

1. A Country Procurement Assessment Report (CPAR) has just been completed. The CPAR makes six major recommendations: (a) revising the existing procurement regulations to make them more transparent, efficient and economic; (b) abolishing the current Central Tender Board (CTB) and creating a procurement regulatory body, the National Procurement Policy Unit (NPPU) - Renamed the Reformed Central Tender Board (RCTB); (c) creating contract committees in all procuring entities; (d) creating procurement units in all procuring entities; (e) employing procurement agents to support all those procurement entities without adequate capacity; and (f) promulgating a procurement law based on the UNCITRAL model.
2. The CPAR was carried out under the aegis of the first Poverty Reduction Support Credit (PRSC1). All the above recommendations have been approved by the Government and their implementation started officially on March 1, 2001. New Procurement Regulations, "*The Public Finance (Procurement) Regulations, 2000*", have been prepared and these became effective on that date. These Regulations are acceptable to the Bank. On the same day, the CTB ceased to exist in its old form with its functions being taken over by contract committees established in each ministry/procuring entity. Each procuring entity is now completely responsible and accountable for all its procurement. The RCTB should have been operational on the same day but there were delays in appointing the Board and recruiting top officials of the Secretariat. The RCTB will be fully operational in September 2001. In the meantime the role of the Secretariat is being played by the Ministry of Finance with the assistance of consultants. The Cabinet has approved the establishment of procurement units in government ministries and the Ministry of Public Service (MPS) is working out the modalities for establishing these units. A draft procurement law based on the UNCITRAL model has been drafted and discussions on the contents have started. The next major activity is to present to Cabinet the principles of the law. After the principles have been approved by Cabinet, the Attorney General will then formally start the drafting process. The plan is to present the bill to Parliament by March 2002. In the meantime, the New Regulations will be the legal instrument that will control procurement in public entities. Implementation of the recommendations started under PRSC1 and is continuing under PRSC2 under financing from the Government, DFID and the Dutch Government.
3. The CPAR identified the lack of adequate procurement capacity as the single most important issue in public sector procurement in Uganda. This has been confirmed in another study carried out in 70 procuring entities at Central and Local Government level. One of the interim solutions that is suggested in the CPAR is the employment of procurement agents to assist weak procurement units. The process of recruiting these agents on the basis of international competition normally takes a long time. While awaiting international recruitment of these procurement agents for medium and long term purposes, DFID is providing short term consultants in 6 key ministries: Agriculture; Education; Finance; Health; Water; and Works.

These consultants are assisting these ministries to carry out procurement under the new Regulations and training staff for this purpose..

### **Use of Bank Guidelines**

4. Procurement of **goods, civil works and supply and installation contracts** will take place in accordance with the Bank's Guidelines for Procurement under IBRD Loans and IDA Credits (January 1995 and as revised in January and August 1996, September 1997 and January 1999). Bank's Standard Bidding Documents for Goods, Works, Supply and Installation of Equipment and Plant, Standard Prequalification Document and the Standard Bid Evaluation Forms will be used. Since there are no existing national standard bidding documents, the Borrower will prepare standard bidding documents for NCB and submit them to IDA for approval. The approved document will form the basis of all NCB procurements under this project. Such NCB procedures will ensure that:

- (i) bids will be advertised in national newspapers with wide circulation;
- (ii) the bid document will clearly explain the bid evaluation and award criteria;
- (iii) bidders will be given adequate response time (minimum four weeks) to prepare and submit bids;
- (iv) bids will be awarded to the lowest evaluated bidder and not arbitrarily;
- (v) eligible bidders, including foreign bidders, will not be precluded from participating; and
- (vi) no domestic preference margins are applicable to domestic manufacturers and suppliers.

5. Procurement of **consultant services** will take place in accordance with the Bank's *Guidelines for the Selection and Employment of Consultants by World Bank Borrowers* (January 1997 and as revised in September 1997 and January 1999). The Bank's Standard Request for Proposals will be used and forms of contracts as needed (lump-sum, time-based, and/or simplified contracts for short-term assignments and individual consultants), as well as the Sample Form of Evaluation Report for the Selection of Consultants.

### **Advertising**

6. A General Procurement Notice (GPN) will be prepared and issued before Board presentation in the *UN Development Business* and in a national newspaper listing all *goods, works and installation* contracts above US\$200,000 and large contracts for consultants services (above US\$200,000 equivalent) to obtain expressions of interest and to draw-up a pool of solid candidate firms from which to compile the short list. Sufficient time will be allowed (minimum of 30 days) before preparing the short list. The GPN will be updated annually for those contracts still outstanding.

7. The related prequalification or bidding documents, as applicable, will not be released - or the short list for consultant services will not be prepared - before eight weeks after the GPN has been published. In addition, expressions of interest may be sought from prospective consultants by advertising in a national newspaper, official gazette or technical magazine. A GPN will also be

issued in the national press or official gazette for contracts to be let under NCB and Specific Procurement Notices (SPNs) for goods and works will be advertised in the national press of wide circulation, and internationally for large contracts (ICB). Sufficient time will be allowed to obtain the bid documents. In the case of assignments estimated at US\$200,000 or less the assignment may be advertised nationally.

## Procurement Capacity

8. A procurement capacity assessment of participating entities has been carried out in accordance with OCS Instructions of August 11, 1998. Procurement under the ERT will be carried out by several public and private enterprises including: 10 public entities; the Private Sector Foundation (PSF); and sponsors (private investors). The assessment was carried out for all public entities, the PSF, one large sponsor (Kakira Sugar Company), and two prospective intermediary banks. Funds out of this Credit will be channeled from the Government to the sponsors through intermediary commercial banks. The intermediary banks would receive these funds from the Government either as loans from the Bank of Uganda (Refinance Facility) or as grants from the Rural Electrification Fund (REF) or the Rural Communication Development Fund (RCDF). The intermediary banks would not do any procurement themselves but they will require some procurement expertise to evaluate procurement arrangements proposed by prospective investors (borrowers). The funds to public entities will be used for procuring various consultancy services for managing the program and for providing advisory services to private investors (sponsors). In the case of the Rural Electrification Authority (REA), funds will also be used for the procurement of office equipment, furniture and motor vehicles for setting up the entity. The Lead Agency for the program is the REA but the Agency has yet to be created. The Ministry of Energy and Mineral Development (MEMD) will, during the interim period, play the role of REA.

9. The procurement capacity assessment entailed interviews with the various entities to determine their ability to carry out procurement in accordance with Bank procurement guidelines. A summary of the existing strengths and weaknesses of the various entities and the associated risk assessment/action plan are presented in the following Table.

**Summary of Procurement Capacity of Participating Agencies**

Agency	Role/Items to be Procured	Strengths	Weaknesses	Risk	Action Plan	Completion Date
Ministry of Energy & Mineral Dev. (MEMD)	Overall Lead Agency in the interim period before REA is created. Will procure Consultancy Services for its own ministry	Contracts Committee in place. MEMD Currently preparing to implement Power IV. Procurement Capacity assessed and strengthened under Power IV.	Strengthened capacity for Power IV inadequate for ERT as well. One engineer being used for both operations but he also has to do other duties. Cannot effectively coordinate the activities of the ERT as well.	High in the interim, but expected to reduce in the medium term	Dedicate the Engineer for the two operations only or obtain short-term procurement consultant to assist him	By Effectiveness
Private Sector Foundation (PSF)	To develop private sector capacities for provision of energy and promoting efficient productive uses of electricity and traditional fuels	Well organized and knowledgeable management. The MD and the Accountant have both been trained on Bank procurement procedures. PSF has been implementing	The PSCP Project Coordinator will assume the coordination role of ERT and she will be responsible for procurement. While she has hands-on experience in procurement, she has not	Medium	Train the Project Coordinator on Bank procurement procedures. She should at least attend a course on	By Effectiveness

	in rural areas. Items to be procured will include: consultancy services, vehicles, office equipment and furniture and operating costs.	the Private Sector Competitive Project (PSCP) financed under the Bank. The project closes on 06/30/01. The Project Coordinator will then be available for the ERT.	had any formal training. Since the PSF will also be providing guidance to sponsors on Bank procurement procedures, the coordinator will not be adequate.		consultants/goods procurement. Recruit another procurement specialist for advising private investors on Bank procurement procedures	
Rural Electrification Authority (REA)	This will be the overall Lead Agency for the Program. Items to be procured will include: consultancy services and training, vehicles, office equipment and furniture, mobile phones and operating costs.	-	Agency has not been created yet. Although substantial procurement will be done by the agency there is no position for procurement officer in the proposed organization.	High	Introduce a procurement position in the organization reporting to office of the Director. Recruit procurement specialist to fill the position. Job Description of position attached.	By Effectiveness
Ministry of Water, Land and Environment	Promoting investments and use of electricity in exploiting and distributing rural water supply. Only item to be procured will be consultancy services.	Contracts Committee operating satisfactorily but procurement unit lacks capacity. A PIU within the Department of Water is currently implementing a Bank financed project. The additional procurement due to the ERT can easily be absorbed by the PIU.	Filing system needs to be better organized.	Medium now, Low once PIU is operational	Involve the PIU in the ERT and improve on the filing system.	By Negotiations
Ministry of Health	Promoting investments and use of energy in the delivery of health services. Items to be procured are consultancy services training, and solar packages.	Contracts Committee operational but needs operating guidelines. No procurement unit (PU) in place yet. The MOH is currently implementing two Bank financed projects (DHSP and STI) and has some in-house experience in Bank procurement procedures in the Project Coordination Office (PCO). The PCO is currently playing the role of PU.	The available procurement capacity in the PCO is being shared with the AIDS Control Project and is therefore inadequate.	High	Attach two engineers to the PCO to work with the procurement specialist. Provide formal procurement training to the two engineers.	By Credit Effectiveness.

Agency	Role/Items to be Procured	Strengths	Weaknesses	Risk	Action Plan	Completion Date
Ministry of Local Government	Promoting investments in rural energy. Items to be procured include consultancy services and training.	Contracts Committee operating satisfactorily. The Decentralization Secretariat is currently implementing two Bank financed projects (ICBP and LGDP). The ICBP is closing on 12/31/01 and extra procurement capacity could be available at that time. The LGDP could also assume additional responsibilities.	The MOLG had not focused on the procurement issue. There is no procurement capacity at the MOLG to implement the ERT.	High	Since the procurement need under the ERT is small compared to the LGDP, the ERT procurement could be assigned to the PIU for the LGDP.	By Negotiations
Ministry of Education	Promoting investments and use of electricity in rural area schools. Items to be procured will include consultancy services and training.	Contracts Committee operating but procurement unit not staffed and ill-equipped. Services to be provided by the PU now being provided by the PIU for the ongoing Bank financed project.	The ongoing Bank financed project closes on 06/30/01. Procurement capacity in the ministry will be substantially depleted unless the procurement staff can be absorbed in the PU.	Medium	Build procurement capacity of PU through the absorption of current PIU procurement specialists	By Effectiveness
Uganda Communications Commission (UCC)	Items to be procured will include: consultancy services and training.	The UCC is in the process of employing a Finance and Administration Officer. Procurement function will be under administration. The Managing Director has experience in Bank procurement procedures and procurement under the ERT will be directly supervised by him. UCC is currently implementing a US\$5.0 million project for frequency monitoring equipment. Bidding documents for this contract were prepared using Bank's Standard Bidding Documents. UCC has its own internal manuals for: procurement; and financial and accounting	Except for the MD himself, nobody else has been trained in Bank procurement procedures.	Medium	Provide Bank procurement training to the engineer who is currently implementing the frequency monitoring equipment contract. In addition train two staff in procurement and attach to ERT program. Review procurement manual to make it consistent with Bank procedures.	By Effectiveness
Ministry of Agriculture	Promoting investments and use of electricity in agriculture activities	-	Contracts Committee not fully operational - does not have a full time Secretary. PU has not yet been created. Implementation arrangements for ERT program not in place partly because the components have not been finalized	High	Employ a procurement specialist to carry out procurement activities under this component	By Effectiveness

Agency	Role/Items to be Procured	Strengths	Weaknesses	Risk	Action Plan	Completion Date
Kakira Sugar Company	Largest private investor in this program (US\$33.0 million). Will produce electricity for sale and own use. Items to be procured will include supply and installation of equipment; consultancy services and vehicles.	The Project Director has implemented a Bank financed project before and is familiar with Bank procurement procedures. He will supervise all the procurement under this project. Detailed specifications for the main supply and installation contract have already been completed.	The company practice has been to buy goods from sources in India and UK and more recently from South Africa. Likely to continue with the same practice for contracts not subject to prior review.	Medium	Contracts for non-prior review procurements to be carried out on the basis of commercial practice but not restricted to three countries only.	Throughout the implementation period.
Nile Bank	Possible Intermediary Bank. Will not do any procurement itself but will need assistance to review implementation arrangements of proposed projects.	Two firms have been borrowing for solar on a short term (6-12 months). Maximum loan amount has been US\$250,000.	No experience with long term borrowing. Likely to consider project proposals of firms the bank has done business and for which a track record has been established. Unlikely to participate in the ERT.	High	PSF to provide assistance in reviewing implementation arrangements for proposed program.	Throughout the program.
Standard Chartered Bank	Possible Intermediary Bank. Will not do any procurement itself but will need assistance to review implementation arrangements of proposed projects.	Willing to participate in activities that have national developmental impact. Very likely to participate in the ERT program	Inadequate capacity to vet technical aspects of projects. Will need assistance in this respect.	High	PSF to provide the necessary technical assistance to the bank as well as the sponsors.	Throughout the program.
Ministry of Finance (MOF)	The MOF will execute the monitoring and evaluation component. It will procure consultants for this purpose	The MOF is currently implementing the Second Economic and Financial Management Project (EFMP2) and has a procurement specialist for this project.	The procurement specialist under EFMP2 is being used for other procurement functions also including the PRSC2. There is a danger of overloading him.	Low	Use the expertise in the EFMP2 PIU to procure for the MOF	By Effectiveness

## Procurement Plan

10. At the moment, only the components of the participating public entities, the PSF and the Kakira Sugar Company are known with some certainty. The actual components for the Refinance Facility, the Rural Electrification Fund (REF) and the RCDF will be known at the time of submitting project proposals by various sponsors. Since each participating entity will carry out procurement for its own components, each entity will be required to prepare a procurement plan for those components. A draft procurement plan for each entity outside the Refinancing Facility and the REF/RCDF should be completed by Appraisal and finalized during negotiations. The plan will cover the entire project period, with a detailed plan for the first year and indicative figures for the remainder of the project period, to be updated each year – the plan will be submitted to IDA every year for its review and comments not later than three months before the end of each fiscal year. The procurement plan will be part of the Project Implementation Plan (PIP). The plan will show the step-by-step procedures and processing times for procurement including: contract packages for goods, works, consultant services and training; estimated cost; procurement/selection method; bidding, evaluation and contract award; the activities which follow contract signature such as manufacture, shipment, delivery and installation of goods; mobilization, construction and completion of works. For the sponsors, their sub-project proposals will include



procurement plans which will be reviewed by the intermediary banks/PSF for consistency with Bank procurement guidelines. The Bank will also review plans for all the sub-projects with contracts estimated to cost more than the prior review thresholds.

### **Operations Manual (OM) and Project Implementation Plan (PIP)**

11. Draft OM and PIP are available and presentation of a final draft will be a condition of negotiations. It is important that the Borrower and its implementing agencies are fully involved in the preparation of these documents to help them better understand the project concept and its objectives, timing and critical path. The PIP should solicit participation of all stakeholders, set out the procurement plans, assess local counterpart fund requirements, specify responsibilities for commitment and implementation, and the risks that need to be controlled. The OM will also describe the modalities for utilizing the Refinancing Facility and the REF/RCDF, including the procurement procedures to be followed for prior and non-prior review contracts.

### **Procurement Implementation Arrangements**

12. Each participating public and sponsor will be responsible for the procurement of its own components. The strengths and weaknesses of each entity are described in the Procurement Capacity Matrix presented above. Many of the participating agencies do not have adequate procurement expertise to carry out procurement in accordance with Bank guidelines and will need assistance from consultants to implement the program.

13. Procurement in the public entities will be carried out by procurement units (PU) and contract committees. The procurement units will carry out the day-to-day procurement activities including: preparation of procurement plans; preparation and processing of bidding/request for proposals documents; evaluation of bids/request for proposals and submission of evaluation reports to contracts committees. The PUs should have the requisite procurement expertise to carry out these activities but these units are still in their infancy and thus lack such expertise. For those entities currently implementing Bank financed projects with project implementing units (PIU) in place, the PUs are using the PIU's experience for these activities. For the others, consultants need to be recruited as soon as possible to provide such expertise. The role of the contracts committees is to approve recommendations for contract awards. The composition of contract committees vary from entity to entity but the Chairman is usually the Permanent Secretary or his representative, a representative from the office of the Attorney General, the internal auditor, selected heads of departments and co-opted members.

14. Procurement by the PSF will be carried out by the Project Coordinator under the supervision of the Managing Director who is well versed with Bank procurement procedures. The coordinator will be responsible for the preparation and processing of bidding and contract documents. Bids/RFPs will be evaluated by an Evaluation Committee. Recommendations of the Evaluation Committee are submitted to the Finance Committee for review before final submission to the Board of Directors for approval. The PSF has clear and adequate internal control mechanisms of ensuring quality and transparency in the procurement process.

16. As far as the possible sponsors are concerned, the implementation arrangements of the Kakira Sugar Company (KKC) could be considered as typical. KKC has a project unit that will be responsible for implementing the project including carrying out all the procurement. The unit consists of a project director, a financial expert, a quantity surveyor and a project coordinator. The project director has experience in Bank procurement procedures having been involved in the Bank financed project for rehabilitation and expansion of the sugar factory at Jinja. The project unit will prepare recommendations for contract awards by the Board of Directors.

#### Procurement methods (Table A)

**Table A: Project Costs by Procurement Arrangements**  
(US\$ million equivalent)

Expenditure Category	Procurement Method <sup>1,3</sup>				Total Cost
	ICB	NCB	Other <sup>2</sup>	N.B.F.	
<b>1. Works</b>	0.00 (0.00)	0.00 (0.00)	3.30 (1.40)	23.13 (0.00)	26.43 (1.40)
<b>2. Goods</b>	35.17 (23.60)	0.57 (0.57)	25.90 (17.90)	18.03 (0.00)	79.67 (42.07)
<b>3. Services</b>	0.00 (0.00)	0.00 (0.00)	16.61 (16.04)	1.00 (0.00)	17.61 (16.04)
<b>4. Miscellaneous</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>Total</b>	35.17 (23.60)	0.57 (0.57)	45.81 (35.34)	42.16 (0.00)	123.71 (59.51)

<sup>1/</sup> Figures in parenthesis are the amounts to be financed by the Bank Credit/Grant. All costs include contingencies.

<sup>2/</sup> Includes civil works to be procured by the private sector within the Commercial Practices threshold, and goods to be procured through national shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and incremental operating costs related to (i) managing the project, and (ii) re-lending project funds to local government units.

<sup>3/</sup> Includes both IDA (\$46.15 million and GEF funds (\$12.12 million).

17. Table A provides project costs by procurement arrangements. The procurement methods to be used will depend on whether the procurement entity is public or private. For private entities, ICB contracts (to be financed under the Refinancing Facility/REF) will include contracts with the following thresholds:

- for goods contracts in excess of \$2 million
- for works contracts in excess of \$3 million
- for turnkey supply and installation contracts in excess of \$5 million

For non-ICB contracts, established commercial practices will be utilized. Three quotes will be required to ensure competitive prices. An opinion from an independent expert acceptable to IDA on the reasonableness of quoted prices will be required for all contracts where 3 quotes are not received. Non-ICB amounts are estimated at \$19.1 million for goods, and \$33 million for works. The procurement methods to be used for the public entities will be as follows.

### **Goods by Public Entities**

18. All contracts for goods estimated to cost US\$100,000 or more will be procured through ICB. To the extent possible, contracts for similar goods will be grouped into packages of US\$100,000 and more so that they can be launched using ICB to obtain more favorable prices. Domestic preference for locally manufactured goods will be applicable for ICB contracts in accordance with the Guidelines for the procurement of Goods and Works (paragraph 2.54 and Appendix 2 of the Guidelines.). Contract for goods estimated to cost less than US\$100,000 equivalent, up to an aggregate of US\$500,000 may be procured through National Competitive Bidding (NCB). Goods estimated to cost less than US\$30,000 equivalent per contract, up to an aggregate amount of US\$600,000 million equivalent may be procured through shopping procedures by soliciting at least three quotations from different suppliers, in accordance with IDA Procurement Guidelines (Paragraph 3.5 and 3.6) and June 9, 2000 Memorandum “Guidance on Shopping” issued by the Bank. Contracts estimated to cost less than US\$50,000, up to an aggregate of US\$200,000 may be procured through the Inter-Agency Procurement Services Office (IAPSO) in accordance with the provisions of paragraph 3.9 of the Guidelines. National shopping for regular operation and maintenance will follow IDA guidelines. Procurement of goods and hiring of facilities for training purposes, such as workshops, will also be carried out through shopping procedures. Records of award decisions on the shopping procedure will be kept for Bank supervision missions.

19. The above aggregate values for NCB and shopping methods for goods are limiting and cannot be exceeded without the prior clearance of the Bank. The procurement unit responsible for the project will maintain a tracking system to monitor such procurement in order to timely alert the Bank when this may occur.

## **Consultancy Services**

20. The total cost of consultant services and training is estimated at US\$18.5 million equivalent. The consultancy services required would cover the areas of energy strategy, sensitization campaigns, project management, procurement, training workshops, start-up and operation of the REA, business development services and monitoring and evaluation. All consulting service contracts costing more than US\$100,000 equivalent for firms will be awarded through Quality and Cost Based Selection (QCBS) method. Consulting service contracts estimated to cost less than US\$100,000 for firms may be awarded through the Consultants' Qualifications selection method. For contracts of a routine nature estimated to cost less than US\$100,000 and where well established practices and standards exist such as financial audits, Least-Cost selection method may be used. All consulting services of individual consultants will be procured under individual contracts in accordance with the provisions of paragraphs 5.1 to 5.3 of the Guidelines. In exceptional cases, Single-Source selection would be used in accordance with the provisions of paragraphs 3.8 to 3.11. Single-Source selection could be used for contracts of US\$10,000 or less subject to an aggregate ceiling of US\$100,000. Procurement for subproject development by the private sector of consultant services under \$100,000 can follow standard commercial practices. In particular, the consultant's qualifications must be adequate to perform the requested services, and the rates must be consistent with comparable consultants of similar capabilities and experience.

22. To ensure that priority is given to the identification of suitable and qualified national consulting firms, short-lists for contracts estimated under US\$100,000 or equivalent may be comprised entirely of national consulting firms (in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines), provided that sufficient number of qualified firms (at least three) are available. However, if foreign firms have expressed interest, they will not be excluded from consideration.

**Table A1: Consultant Selection Arrangements (optional)**  
(US\$ million equivalent)

Consultant Services Expenditure Category	Selection Method							Total Cost <sup>1</sup>
	QCBS	QBS	SFB	LCS	CQ	Other	N.B.F.	
<b>A. Firms</b>	7.64 (7.64)	0.00 (0.00)	0.00 (0.00)	0.20 (0.10)	1.03 (1.03)	2.39 (2.39)	1.05 (0.00)	12.31 (11.16)
<b>B. Individuals</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	4.88 (4.88)	0.42 (0.00)	5.30 (4.88)
<b>Total</b>	7.64 (7.64)	0.00 (0.00)	0.00 (0.00)	0.20 (0.10)	1.03 (1.03)	7.27 (7.27)	1.47 (0.00)	17.61 (16.04)

1\ Including contingencies

Note: QCBS = Quality- and Cost-Based Selection

QBS = Quality-based Selection

SFB = Selection under a Fixed Budget

LCS = Least-Cost Selection

CQ = Selection Based on Consultants' Qualifications

Other = Selection of individual consultants (per Section V of Consultants Guidelines),  
Commercial Practices, Single-Source Selection, etc.

N.B.F. = Not Bank-financed

Figures in parenthesis are the amounts to be financed by the Bank Credit/Grant.

#### **Prior review thresholds (Table B)**

15. Table B provides the prior review thresholds.

**A. Public Entities.** Each contract for goods estimated to cost US\$100,000 equivalent or more, will be subject to IDA prior review as per paragraph 2 Appendix I of the Guidelines. Other contracts will be subject to post review in accordance with paragraph 4 Appendix I of the Guidelines. All consulting contracts costing US\$100,000 equivalent or more for firms will be subject to IDA prior review. Except for the technical audits of the UCC component, each contract for employment of individual consultants estimated to cost the equivalent of US\$50,000 or more, the qualifications, experience, terms of reference and terms of employment of the consultants shall be furnished to IDA for its prior review. The applicable prior review threshold for the technical audits shall be US\$30,000. All single-source selection of consultants will be subject to IDA prior review. Other procurements subject to IDA review will include: training workshops estimated to cost more than US\$50,000; all overseas training; and any exceptional extensions to non-prior review contracts raising their values to levels equivalent or above the prior review thresholds. These limits must be monitored closely and should never be exceeded before clearance from IDA.

**B. Refinance/Credit Support Facility, REF and RCDF.** Each contract for supply and installation of equipment and plant estimated to cost US\$5.0 million equivalent or more, each contract for works estimated to cost US\$3.0 million or more and each contract for goods estimated to cost US\$2.0 million and more, will be subject to IDA prior review as per paragraph 2 Appendix I of the Guidelines. The procedures for presenting these contracts to IDA will be clearly specified in the PIP.

**Table B: Thresholds for Procurement Methods and Prior Review <sup>1</sup>**

<b>Expenditure Category</b>	<b>Contract Value Threshold (US\$ thousands)</b>	<b>Procurement Method</b>	<b>Contracts Subject to Prior Review (US\$ millions)</b>
<b>1. Works</b>	Refinance/Credit Support Facility and Rural Electrification Fund: 3000 and above  Below 3000	ICB  Established Commercial Practices	3000
<b>2. Goods</b>	Refinance/Credit Support Facility & RE Fund 2000 and above  Below 2000  All other Components 100 and above  30 - 100  Below 30	ICB  Established Commercial Practices  ICB  NCB  Shopping	2000    100  30
<b>3. Services</b>	200 and above	QCBS (intl. advert)	All
<b>Firms</b>	100 - 200	QCBS (intl. shortlist)	All
<b>Individuals</b>	Less than 100	CQ	TORs
	50-200	Individual	All TORs
	Less than 50	Individual	Post Review
	Less than 50	single Source	TORs
<b>4. Training &amp; Workshops</b>	no threshold		all involving international travel
<b>5. Miscellaneous</b>			
<b>6. Miscellaneous</b>			

**Total value of contracts subject to prior review:** \$43 million

**Overall Procurement Risk Assessment**

**High**

**Frequency of procurement supervision missions proposed:** One every 6 months (includes special procurement supervision for post-review/audits)

**Prior Review Thresholds:**

	<u>Public Entities</u>	<u>Project Sponsors</u>
Supply and Installation of equipment. & plant equiv.	-	US\$5.0 million
Works	-	US\$3.0 million equiv.
Goods	US\$100,000 equiv.	US\$2.0 million equiv.
Consultancy Services (Firms)	US\$100,000 equiv.	NA
Consultancy Services (Individuals)	US\$50,000 equiv.	NA

<sup>1</sup>Thresholds generally differ by country and project. Consult OD 11.04 "Review of Procurement Documentation" and contact the Regional Procurement Adviser for guidance.



## Disbursement

### Allocation of credit/grant proceeds (Table C)

**Table C: Allocation of Credit/Grant Proceeds**

<b>Expenditure Category</b>	<b>Amount in US\$million</b>	<b>Financing Percentage</b>
1. Credit Support Facility (IDA)	2.70	90% of Subloan Amount
2. RE Subloans for initial Projects (IDA)	12.56	90% of Subloan Amount
3. Rural Electrification Fund Subgrants (IDA)	6.26	100% of Grant Amount
4. RE Subgrants for initial Projects (IDA)	4.86	100% of Grant Amount
5. Capacity Building - Participating Ministries	2.43	100% of foreign, 90% of local
- Consulting Services, Training, and Audit Fees (IDA)	7.63	100% of foreign, 90% of local
- Goods (IDA) MEMD/REA/Participating Ministries/PSF	4.50	100% of foreign, 90% of local
6. Goods (GEF) Rural Telecom Fund Subgrants (IDA)	1.08	100% of foreign, 90% of local
7. Rural Telecom Fund Subgrants (IDA)	4.50	100% of Grant Amount
8. Operational/Operating Expenses (IDA) REA/PSF/MEMD/BOU	1.23	100% of foreign, 90% of local
9. Operating Expenses (GEF) (PSF)	0.20	100% of foreign, 90% of local
10. Subgrants (GEF)	6.39	100% of Grant Amount
11. Consultant Services & Training (GEF) (PSF)	0.80	100% of foreign, 90% of local
12. Unallocated (IDA)	4.91	
13. Unallocated (GEF)	1.21	
<b>Total Project Costs</b>	61.26	
<b>Total</b>	61.26	

*\*Includes both IDA (\$46.15 million and GEF funds (\$12.12 million).*

### **Use of statements of expenditures (SOEs):**

The thresholds for SOEs would be set at:

Goods:	US\$100,000
Consultant Firms & Training	US\$100,000
Individual Consultants	US\$50,000

**Special account:**

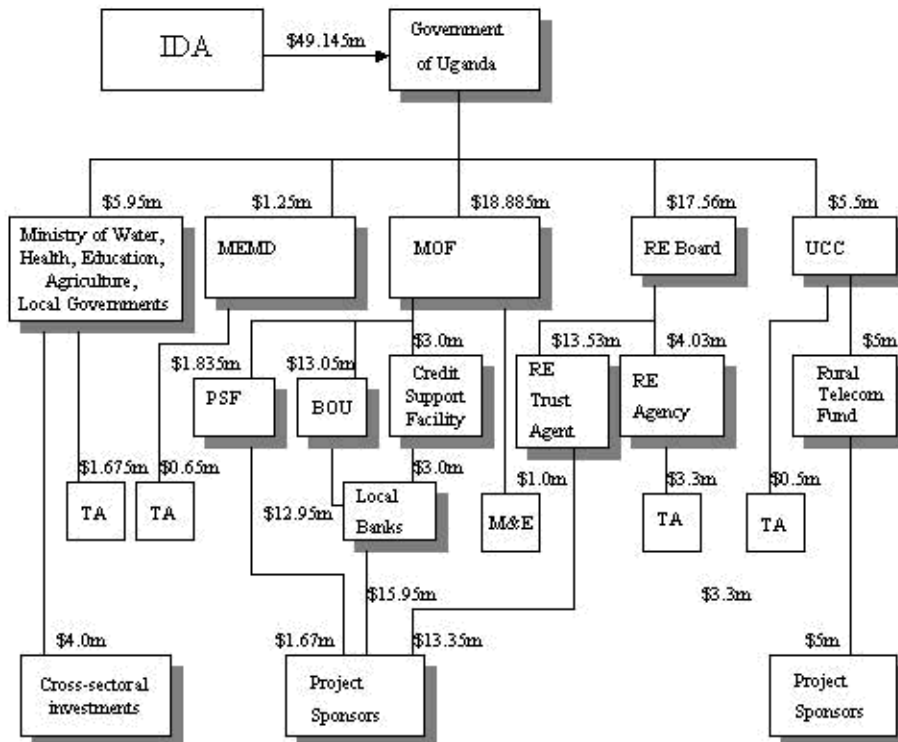
To facilitate disbursements, the Government of Uganda will establish and maintain a Special Account in US dollars in a commercial bank acceptable to IDA. In order to ensure timely release of funds for the project activities, a Project Account in Uganda shillings will be maintained in the same bank. Sub-project bank accounts will also be maintained by the implementing agencies. The initial deposit under traditional disbursement mechanisms will be set up at US\$ million, and the authorized special account amount under the Project Management Report based disbursement will be enhanced to US\$ million.

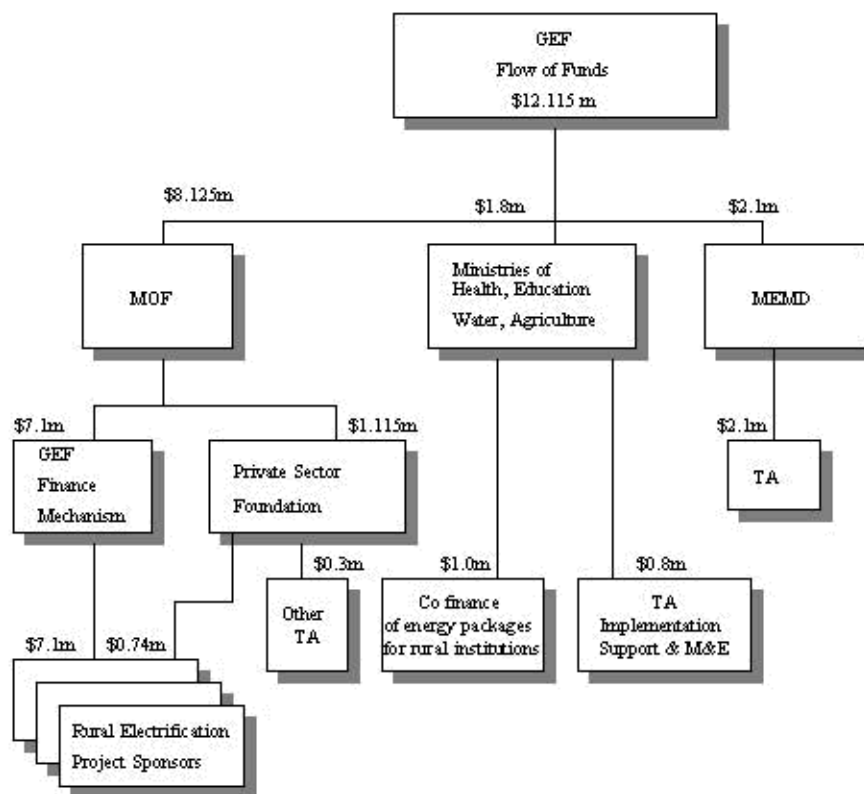
Special Accounts will be established by the implementing agencies as given below. In addition, sub-accounts for line ministries will be established under the RE Agency Special Account. This will permit the RE Agency to maintain overall accounting for these expenditures. Project Accounts, for the counterpart contributions will also be required. These will be opened for the: i) UCC, with an annual deposit of \$300,000 starting in Project year 2 to cover its counterpart funding requirements; ii) PSF, with an initial deposit of \$9,000 to cover the 10% counterpart contribution required on local expenses; iii) Ministry of Health, to cover the 10% contribution on the energy packages for rural health facilities, with an initial deposit of \$50,000, and future deposits to be agreed during supervision; iv) Ministry of Education, with an annual deposit of \$115,000 starting in year 2 to cover its counterpart funding requirements for the energy packages on rural schools.

	IDA			GEF	
	Special Account	Sub-Account	Project Account	Special Account	Project Account
Rural Electrification Agency	1 *			1	
MEMD (Energy)		1			1
Uganda Communications Commission	1		1		
Private Sector Foundation	1		1	1	
Bank of Uganda	1				
MOFP(Finance)		1			
MOA(Agriculture)		1			1
MOH(Health)		1	1		1
MOE&S (Education)		1	1		1
MOWL&E (Water)		1			1
MOLG (Local Government)		1			1
<b>Total</b>	<b>4</b>	<b>7</b>	<b>4</b>	<b>2</b>	<b>6</b>

\* This special account will be opened in the names of both MEMD and REA. MEMD will operate the account until such time as REA has a financial management system acceptable to IDA. At this time, the management of the account will transfer to REA, and MEMD's name will be removed from the account.

## IDA Flow of Funds (\$49.145 million)





## Financial Management Overview

An assessment of the financial management arrangements for the project has been carried out. Except for the REA which is yet to be established, the arrangements for all the components meet the World Bank's minimum requirements under OP/BP10.02. The implementing agencies for the other components ( i.e. the PSF, BoU, UCC and MEMD) already have well established accounting systems. The UCC, whose existence is underpinned by the Uganda Communications Act which lays out its activities, composition, organizational structure and reporting and auditing requirements, is undertaking reforms to strengthen its

system. Current accounting procedures are well documented in both the UCC and the PSF, and the process of computerizing the accounting systems is on-going. The MEMD is undertaking a plan of actions to strengthen its systems and its capacity as the implementing agency for another IDA funded project, the Fourth Power project. BoU has substantial experience in implementing World Bank funded projects similar to the component under ERT and already has strong institutional arrangements into which project implementation will fit. The assessment for the REA will be done after modalities for establishing the agency have been finalized.

While the current financial management arrangements satisfy IDA's minimum requirements, they are not adequate to provide, with reasonable assurance, accurate and timely information on the status of the Project as required by IDA for PMR-based disbursements. The project is therefore not yet ready for PMR-based disbursements, as outlined in the World Bank's Loan Administration Change Initiative Handbook (LACI, September 1998). Plans of actions for each component are outlined below the completion of which will allow for the credit to be disbursed on the basis of PMRs. These will be agreed during negotiations for the Credit. The results of the assessments are outlined below.

## **Generic Issues**

### ***Country Issues***

A Country Financial Accountability Assessment for Uganda was carried out by a World Bank led team and issued its report in January 2001. The report summarizes the fiduciary risks within the country's financial management environment, assesses government efforts to address identified weaknesses and proposes ways in which to mitigate the identified risks.

### ***Financial Reporting***

The financial management systems adopted for all the components of the project should be capable of producing reports that will be used by management and other stakeholders in the implementing agencies to monitor their transactions and operations. Suitable formats of these reports should be designed and their periodicity determined.

Reports that should be produced on a **quarterly** basis to support requests for replenishment of the project's Special Account will include the following:

- **Financial Statements:** These are to provide information on the sources and uses of funds by loan category and by project activity, forecasts of expenditure, amount of disbursement requested and a reconciliation of the SA.
- **Project Progress Reports:** These are to provide information on project implementation progress in physical and financial terms using monitoring indicators, including identifying deviations from plan and explaining reasons for such variations.
- **Procurement Management Reports:** These are to indicate the status of procurement and contract commitments and expenditure including source of supply data for contracts subject to the Bank's prior review, as well as post-review contracts above a certain threshold.

Annual Financial Statements and Annexes for the project will include:

- **Statement of Sources and Uses of Funds** showing funds from IDA and Counterpart Funds separately, a summary of expenditures analyzed under the main headings and by main category of expenditures (consistent with the Development Credit Agreement), both for the current fiscal year

and accumulated to date.

- **Notes** in respect of significant accounting policies and accounting standards adopted by management when preparing the accounts and any supplementary information or explanations that may be deemed appropriate by management in order to enhance the presentation of a “*true and fair view*”.
- **Special Account Statement** showing deposits and replenishments received, payments substantiated by withdrawal applications, interest that may be earned on the account and the balance at the end of the fiscal year;
- **A Reconciliation** between the amounts shown as “Received by the Project from IDA and that shown as having been “Disbursed” by them.
- **Implementation Report**, which would be a narrative summary of the implementation progress for the project.
- **Summary of Credit Withdrawals** using PMRs, listing individual withdrawal applications by reference number, date and amount.

Indicative formats of these statements will be developed and agreed with IDA. Additional reporting requirements for each component are outlined below.

#### ***Linkages between Expenditure and Physical Activities***

Inputs and outputs of financial information required to track project implementation will be identified for each component. In addition, important items on which physical data which would be captured and included in the financial reports will be identified, and so will methods of capturing the physical data, and linkages with financial reports. These will be documented in the Financial Management Manuals for each component.

Project Implementation Plans will address the following areas:

- Inputs and Outputs of financial information required to track project implementation;
- Inputs and Outputs of physical information matched with financial information required;
- Arrangements for recording project impacts, outcomes, outputs, and inputs that are required to assess project progress toward project objectives.

#### ***Books of Accounts and lists of accounting codes***

Separate books of accounts will be maintained by the implementing entities for project transactions for the ERT components and will include:

- a) Cash Book;
- b) Ledgers;
- c) Journal Vouchers; and
- d) Contracts register

For each component, a list of accounts codes (Chart of Accounts) will also be drawn up for project transactions. This should match with the classification of expenditures and sources and application of funds indicated in the Credit Agreement. The Chart of accounts should be developed in a way that allows project costs to be directly related to specific work activities and outputs of the project. The Books and Charts of accounts will be completed by Credit effectiveness.

### ***Disbursement of the IDA Credit to the Implementing agencies***

The disbursement of the IDA Credit will be done quarterly based on Project Management Reports (PMRs) that integrate project accounting, procurement, contract management, disbursement and audit with physical progress of project implementation.

The PMRs will include information under three main categories:

- A project financial statement which includes a summary of sources and uses of funds, an updated six-month forecast, a Special Account reconciliation statement, and a statement of eligible expenditures by disbursement category;
- A project progress report which explains variances between actual physical and financial progress versus forecasts; and
- A procurement management report which shows procurement status and contract commitments.

An advance will be made into the Special Account maintained by each implementing agency at the inception of the project or when the project component qualifies for the PMR-based disbursement procedure. The advance is meant to cover project expenditures for 6 months as indicated in an initial six-month cashflow forecast. After every subsequent quarter, the project will submit PMRs which include a cashflow forecast for the following 6 months. The cash request at the reporting date will be the amount required for the following 6 months as shown in the approved PMRs less the balance in the Special Account at the end of the quarter. Subsequent disbursements of the IDA Credit will therefore be made in respect of this cash request.

There will be a transitional period between the date of Credit effectiveness for the project and the date each component qualifies for disbursement of the Credit on the basis of PMRs. **The date of qualification for PMRs shall not exceed eighteen months after Credit effectiveness.** During this period, disbursement will be on the basis of Statements of Expenditure (SOEs). An advance will be made into the Special Account upon Credit effectiveness and subsequent replenishments will be made on the basis of withdrawal applications and Statements of Expenditure (SOEs) showing payments made out of the Special Account. Supporting documents for transactions that fall below the SOE threshold will be retained at the project offices for inspection in accordance with World Bank agreements. A threshold will be determined above which payments may be made to contractors or suppliers directly from IDA.

During the transitional period, quarterly reports and forecasts that are required under PMR-based disbursements will be prepared by the project and submitted to IDA for review. They will be used to assess progress towards meeting the requirements of PMR-based methods of disbursement. At the time of conversion, the project will prepare a reconciliation of project expenditures, disbursements received, and Special Account movements up to the proposed date of the conversion. Other details for the conversion will be worked out closer to the time of conversion between the project team and IDA.

Subject to the necessary agreement, IDA and the project components will retain the option of disbursing the Credit through direct payments from IDA to operators/contractors on contracts above a threshold to be determined. Withdrawal applications for such payments will be accompanied by relevant supporting documents such as copies of the contract, contractors' invoices and relevant certifications.

A description of the assessment of the financial management arrangements for each component follows below.

## **RURAL ELECTRIFICATION AGENCY COMPONENT**

### **Flow of funds and disbursement arrangements**

The disbursement of the IDA Credit to the RE Agency has been outlined above.

#### ***Disbursement of Funds to other ministries***

Disbursement in respect of activities implemented by ministries other than the MEMD should mostly be done using direct payments from IDA. This is due to the nature of the activities which would yield a limited number of payments to consultants. Where it is justified, a project account will be opened by the ministry which would be periodically replenished from the REA Special Account upon the submission of appropriate supporting documentation relating to previous advances. The REA would be expected to maintain an Internal audit Unit that would carry out inspection visits to review supporting documentation.

### **Financial Management System**

The REA strategy should lay the foundations for the establishment of the REA. Set out below are financial management related issues that should be taken into consideration in formulating this strategy.

#### **Line Ministries**

The financial management system in Line Ministries is defined by Government Regulations, including the Public Finance Act and the Treasury Instructions. Responsibility for accounting matters within these ministries rests upon the Permanent Secretary in each ministry. Given the small size and number of transactions in components implemented by the ministries, these arrangements are deemed suitable. The section of the REA strategy document covering the ERT Project should map out as appropriate the interfaces between the REA and the line ministries.

#### **Overall Policy Guidance**

It is proposed that a Financial Management Committee should be established as part of the RE Board. This would be responsible for overall policy guidance relating to financial management matters for the REA, including the projects implemented by the agency.

#### **Organizational structure and Staffing**

The RE Fund Procedures and Administration Manual show the RE Agency's organizational structure which includes an Administrative Officer who will perform the daily Financial Management control and monitoring of REA funds will also prepare the required Financial Management Reports. A Finance Unit will process subsidy applications. Both the Administrative Officer and the Finance Unit report directly to the Agency Director.

#### **Accounting Policies and Procedures**

The strategy document should describe key accounting policies and procedures that demonstrate the adequacy of the project financial management system.



## **Auditing arrangements – Internal and External Audit**

The internal audit function is expected to play a big role in determining compliance with established policies and procedures. The internal audit function should also shoulder the responsibility of inspecting SOE records maintained by line ministries implementing project activities and for verifying regular returns to the REA. It is also expected that external auditing arrangements will be in line with Government regulations, with the Office of the Auditor General performing the audit. The audit engagement may be sub-contracted to a firm of private auditors. In such a situation, the OAG would be expected to issue the final audit opinion.

It is also expected that the following audit reports will be required to be submitted to IDA under the Credit Agreement not later than 6 months after the end of the REA financial year: REA – Entity Accounts; Project Accounts; Statement of Expenditures (SOE); and the Special Account.

## **Information Systems**

The REA strategy should also indicate a proposed schedule for the computerization of its accounting system.

## **Books of accounts and list of accounting codes**

It is expected that the REA will be responsible, in line with its overall coordination mandate, for the consolidation of transactions arising from activities implemented by the line ministries.

## **Financial Reporting**

Suitable arrangements should be put in place to enable the REA to gather information on activities implemented by the ministries. This should be done through a requirement for ministries to regularly report their transactions to the REA for consolidation. Suitable formats should be agreed between the ministries and the REA. The REA will also have the responsibility of verifying the figures reported by the ministry.

## **UGANDA COMMUNICATIONS COMMISSION COMPONENT**

The Commission funds its normal operations using: money appropriated by the legislature from time to time for enabling the Commission to perform its functions; licence fees and money paid for services rendered by the Commission; a percentage of the gross annual revenues of operators (approved by the Minister in consultation with the Minister responsible for Finance); donor funds and money borrowed by the Commission; and loans, grants, gifts or donations from government and other sources, acceptable to the Minister and the Minister responsible for Finance with the approval of Parliament.

## **Flow of funds and disbursement arrangements**

### ***Disbursement of Funds from UCC to Implementing agencies and contractors***

UCC will operate 1 Special Account from which funds will be disbursed either for the RCDF or for all other payments including those in respect of Technical Assistance contracts. Signatories to this account should also be documented in the project's relevant manuals and they should be opened by the time the project becomes effective.

Investment subsidies will be paid to operators in a number of tranches. A small tranche is likely to be paid at the time of contract signature. One or more subsequent tranches will be paid upon the audited completion of the investments required to meet the specified service obligations. For projects involving WB finance, the auditing of these obligations will be contracted to an independent engineering consultant, funded from the TA sub-component. The independent auditor will send copies of his certification to the Project Officer and the selected operator.

The subsidy disbursement cycle starts with a request from the operator to pay amounts as agreed in the contract. The first payment under a contract would be the advance payment. Subsequent payments fall due periodically subject to the achievement of certain targets as described in the contract. The verification of the achievement of these targets will be carried out by an independent consultant who will provide a certification to the RCDF. The Accounts department in UCC will prepare documentation containing instructions to the bank to make a payment. This instruction will be given to the Project Officer who will arrange to sign a check. The check will also be signed by the RCDF Board Chairman. The check will be accompanied by a written instruction to pay.

After making the disbursement, the bank will be required to provide UCC with an acknowledgement of payment, and the operator will be required to provide a receipt.

Under the traditional disbursement method, direct payments may be made to contractors by IDA upon application by the UCC. The supporting documentation that will be necessary to support such requests for direct payment will include the Contract, contractor's Invoice and any certifications.

## **Financial Management System**

### ***Staffing***

The Act provides for the directorate of the Commission and vests it with the duty of carrying on the day to day implementation of the decisions of the Commission. The directorate is headed by a full time Executive Director who appointed by the Minister on the recommendation of the Commission on terms and conditions that the Commission may determine. The Executive Director, who reports to the Commission, is appointed for a period of five years and is eligible for re-appointment for a second term. The Executive Director is responsible for the day to day operations of the Commission.

The Act defines the duties of the Executive Director, and these include

- managing the funds and property of the Commission;
- administering, organizing, supervising and generally controlling the staff of the Directorate; and
- keeping records of all the transactions of the Commission

The organizational structure of UCC provides for a Finance Department headed by a Financial Manager, reporting to the Executive Director. Various reforms in the Finance Department are underway. These include the recruitment of a Financial Manager who will supervise the project accounting function under the supervision of the Executive Director. Specific responsibility for the handling of project transactions will be allocated to an officer within the department who will report to the Financial Manager. Computerization of the accounting system is also underway, and duties within the accounting department will be more clearly defined after this exercise is completed. An appropriate training program should also be designed to enable the staff in the Finance Department to acquire knowledge of IDA disbursement, procurement and financial management policies. UCC has indicated that this process, including the allocation of staffing and management responsibilities and recruitment of a Financial Manager should be

completed and communicated to IDA by **Credit effectiveness**.

### ***Accounting Policies and Procedures***

The accounting policies and procedures of the Uganda Communications Commission are detailed in the Accounting Manual. These will be updated to take into account the requirements of the project and the computerization of the accounting system.

### ***Budgeting and Planning***

The Act requires the commission to prepare and submit its annual budget to the Minister for approval not less than two months before the beginning of each financial year. The Commission cannot incur any expenditure exceeding its budget without the approval of the Minister. In such cases, a supplementary budget is presented by the Minister to Parliament for approval.

### ***Internal Audit***

There is no internal audit function provided for within the UCC organizational structure, given the small number of transactions that are undertaken by the UCC. However, the option to contract out internal audit services, especially where the need for these is identified, should be retained by the UCC management.

### ***Books of accounts and list of accounting codes***

The Act requires the Commission to keep proper books of accounts and records of its transaction and affairs, to prepare annual accounts within three months of the close of its financial year and to submit these for audit to the Auditor General who is required to perform the audit within two months of receipt of the annual accounts of the Commission, and to submit the report on the audited accounts to Parliament.

The financial year of the Commission runs from 1 July to 30 June.

### ***Information Systems***

The accounts are maintained manually with the use of spreadsheets for preparing reports. Although this is satisfactory given the expected number of transactions under the project and would meet the basic requirements of PMR-based disbursements, UCC is currently installing the Solomon IV software which will be used to maintain its books of accounts.

The planned upgrade of the computer systems is satisfactory for purposes of the project. The system should be fully installed and operational by 31 August 2001.

The computerization will help to reduce the risk of human errors in record keeping, and would help enhance the efficiency of the process of preparing reports.

### ***External Audit***

The Auditor General is primarily responsible for the auditing of all statutory organizations, including the UCC. The audit may be subcontracted to a firm of private auditors, with the final report being issued by the Auditor General, based on the tests carried out by the subcontracted firm.

The Act requires the Auditor General to perform the audit of the UCC accounts within two months of receipt of the annual accounts of the Commission, and to submit the report on the audited accounts to Parliament. The submission to Parliament is therefore required to be done by 30 November each year.

The first set of accounts prepared for the Commission were those for the financial year ended 30 June 1999. Although these have been submitted to the Auditor General for audit, together with those for the year ended 30 June 2000, both audit reports have not yet been submitted to Parliament as required by the Act.

The Project Agreement should clearly indicate that the accounts for the component should be audited and submitted to IDA within 6 months of the end of the financial year, in accordance with IDA general practice. In addition to the accounts for the project, Special Account and on the use of the SOE/PMR procedure, the accounts for the UCC entity will be required to be submitted each year in the same time period.

Arrangements for the external audit of the financial statements of the project will be determined and communicated to IDA. The audit report will be submitted to IDA within six months after end of each financial year. Any firm of auditors subcontracted to carry out the audit should meet IDA's requirements in terms of independence, qualifications and experience. Appropriate terms of reference for the external auditor must also be developed and agreed between UCC and IDA by **31 December 2001**.

The following audit reports will therefore be due for submission to IDA by 31 December each year:

- Uganda Communications Commission – Entity Accounts
- Project accounts
- The use of Statement of Expenditure (SOE) or PMR procedure
- Special Account

### ***Financial Reporting***

UCC currently produces regular financial reports to management on a weekly and monthly basis. Quarterly, semi-annual and annual reports are also prepared and submitted to the Commission and the Ministry. These reports contain financial information on the transactions of the UCC. They provide a report on variances between actual amounts and those budgeted, together with a commentary on the physical achievement of UCC targets and objectives. The current system of reporting provides a sufficient background to the development of reports required for the project. Formats of the various periodic project financial reports to be generated from the financial management system will be developed. There should be clear linkages between the information in these reports and the Chart of Accounts. The financial reports should be designed to provide quality and timely information to project management, implementing agencies, and various stakeholders on project performance.

These reports include financial statements (e.g. sources and application of funds; expenditure classified by project components, disbursement categories, expenditure types and implementing agencies, and comparison with budgets; short-term forecasts of expenditure; unit costs for key items and comparison with budgets; etc.). The reports will closely follow sample formats that are given in the World Bank's Loan Administration Change Initiative (LACI) Handbook.

UCC will also prepare entity financial statements that will consolidate project and non-project expenditures.

### **Action Plan**

The action plan below indicates the actions to be taken for UCC to strengthen its financial management system and for the project to qualify for PMR-based disbursements, and the dates that they are due to be completed by.

	<b><u>Action</u></b>	<b><u>Date due by</u></b>	<b><u>Responsible</u></b>
1	Agreement of terms of reference for external audit	31 December 2001	UCC, Bank
2	Recruitment of Financial Manager and allocation of responsibilities for project transactions	Credit Effectiveness	UCC
3	The appointment of members of the RCDF Board	Credit Effectiveness	UCC
4	Opening Bank Accounts	Credit Effectiveness	UCC
5	Development of Chart of Accounts showing codes under which project transactions will be recorded	Credit Effectiveness	UCC
6	Definition of indicators that will show linkages between financial information and physical data	Credit Effectiveness	UCC
7	Update of Accounting Manual describing computerized accounting systems and procedures, internal controls, funds flow processes and books of accounts to be maintained and showing linkages between financial information and physical data: <ul style="list-style-type: none"> <li>• First draft</li> <li>• Final draft incorporating IDA comments</li> </ul>	31 December 2001 Credit effectiveness	UCC; Bank to approve
8	Development of financial reporting formats including those for Project Monitoring Reports	31 December 2001	UCC, Bank

## **MINISTRY OF ENERGY AND MINERAL DEVELOPMENT (MEMD) COMPONENT**

The disbursement of the IDA Credit to the MEMD and the bank accounts it will operate have been described above. Signatories to the accounts will also be documented in the project's relevant manuals and they should be opened by the time the project becomes effective.

MEMD is implementing a plan of actions to strengthen its financial management system in readiness for the Power IV project. The actions being implemented are as follows:

- Appointment of Project Accountant for the accounting section and allocation of accounting duties
- Preparation of Financial Management Manual describing accounting systems and procedures, internal controls and funds flow processes:
- Opening books of account and completion of the Chart of Accounts

The following actions have already been carried out

- Agreement of financial reporting formats
- Agreement of terms of reference for external audit
- Agreement of Terms of Reference for the Financial Management Committee
- These will be used for the ERT component implemented by the MEMD.

The following section explains some of the actions set out above in more detail.

### ***Staffing and Institutional Arrangements***

The components implemented by the MEMD will be directly under the Department of Energy. MEMD is also the implementing agency for the IDA financed Power III and Power IV Projects in addition to other donor financed projects, and it is expected that initially, the financial management arrangements used for the ERTTP will be based on those already agreed with IDA for Power IV.

The Permanent Secretary, MEMD, is the "Accounting Officer" for the project with overall responsibility for accounting for the project funds for the components implemented by the MEMD. The Department of Energy is headed by a Commissioner. MEMD has appointed the Assistant Commissioner for Energy Efficiency to be responsible for the implementation of the components of ERTTP. He will report to the Commissioner for Energy and the Permanent Secretary, MEMD.

The accounting unit in the MEMD is headed by a Senior Accountant. Under Power III, responsibility for day to day project accounting matters lies with an accounts clerk who reports to the Project Coordinator under the supervision of the Senior Accountant. There are plans for a suitably qualified and experienced accountant to be appointed who will handle the day to day transactions of Power IV project under the same reporting and supervision arrangements. The qualifications required for an accountant include a Bachelor's degree in accounting, a professional qualification and suitable experience. It is envisaged that the accountant will also take over primary responsibility for the maintenance of the ERT component's books and records. Duties within the accounting section, reporting lines and supervisory responsibilities should be clearly demarcated and documented.

### ***Overall Policy Guidance***

A Financial Management Committee exists and is chaired by Minister of State for Energy. It consists of

Commissioners and Under-Secretaries. It is planned that suitable Terms of Reference for the Committee in relation to the Project will be drawn up and incorporated into its general TORs.

### ***Internal Audit***

The internal audit function within the MEMD is statutorily provided for. The Chief Internal Auditor will also take on the responsibility for the project and report directly to the Permanent Secretary.

### ***External Audit***

Projects that are implemented by the MEMD have their accounts audited by a private firm of auditors appointed by the Auditor General. The final report is signed by the Auditor General and is based on tests carried out by the appointed private auditors. With some exceptions in the meeting of agreed deadlines, both implementing agencies have in the past submitted project accounts to IDA as required by the terms of the credit agreement. Similar arrangements will be adopted for the project. Terms of reference for the annual audit of the Power IV project have been developed and are applicable to the ERTIP subject to necessary amendments.

The audit reports on the Project accounts, Special Account and on the use of the SOE/PMR procedure will be due for submission to IDA not later than six months after the end of the financial year which runs from 1 July to 30 June.

### ***Information Systems***

The system currently in place in the MEMD is a manual based system, with accounting transactions being recorded manually into books of accounts and reports and analyses being produced on computer spreadsheets. Given the size of the project, it will be necessary to computerize the accounting system in order for the project to maintain its books of accounts effectively. There are plans to upgrade the books of accounts maintained for the projects implemented by the MEMD.

### ***Financial Reporting***

The Department of Energy currently produces regular financial reports for the MEMD on a monthly, quarterly and on a semi-annual basis. These reports contain financial information on the projects implemented by the Department. This system of reporting provides a sufficient background to the development of reports required for the project. Formats of the various periodic project financial reports to be generated from the financial management system will be developed. There should be clear linkages between the information in these reports and the Chart of Accounts. The financial reports should be designed to provide quality and timely information to project management, implementing agencies, and various stakeholders on project performance.

These reports include financial statements (e.g. sources and application of funds; expenditure classified by project components, disbursement categories, expenditure types and implementing agencies, and comparison with budgets; short-term forecasts of expenditure; unit costs for key items and comparison with budgets; etc.). The reports will closely follow sample formats that are given in the World Bank's Loan Administration Change Initiative (LACI) Handbook.

## Action Plan

The action plan below indicates the actions to be taken for the project to achieve eligibility for PMR-based disbursements, and the dates that they are due to be completed by.

	<u>Action</u>	<u>Date due by</u>	<u>Responsible</u>
1	Agreement of terms of reference for external audit	31 December 2001	MEMD, Bank
2	Allocation of responsibility for the project accounting function in the in the DoE to an appointed Project Accountant	Credit Effectiveness	MEMD
3	Linkage of physical information with financial data	Credit Effectiveness	MEMD; Bank to review
4	Preparation of Financial Management Manual describing accounting systems and procedures, internal controls, funds flow processes and books of accounts to be maintained: <ul style="list-style-type: none"><li>• First draft</li><li>• Final draft incorporating IDA comments</li></ul>	31 December 2001 Credit Effectiveness	MEMD; Bank to review
5	Development of a Chart of Accounts	Credit Effectiveness	MEMD
6	Agreement on financial reporting formats	31 December 2001	MEMD, Bank
7	Opening Bank Accounts, and preparation of initial cashflows	Credit Effectiveness	MEMD

## PRIVATE SECTOR FOUNDATION (PSF)

The disbursement of the IDA Credit to the PSF and the bank accounts it will operate have been described above. Signatories to the accounts will also documented in the project's relevant manuals and they should be opened by the time the project becomes effective. The Finance Manager, PSF, is the authorized signatory on all special accounts.

### *Payments to operators*

Payments of grants will be on a reimbursement basis, conditional upon the verification of defined deliverables and of submission by claimants of receipted invoices/vouchers.

Payments of grants from the Special Account set up for BUDS will require two check signatures: that of the BUDS-RE Manager and that of the Project Coordinator of the PSF. Small payments up to US\$5,000 will require the signatures of the BUDS-RE Manager and the Finance Manager, PSF. Grants of more than \$5,000 will require the signature of the Finance Manager, PSF, and Chairman or Vice Chair of PSF.

The BUDS-RE team will work independent of the PSF finance team so that all claims for reimbursement under matching grants and GEF performance based grants are independently checked by the Finance team before payment is made.

## Financial Management System



### ***Overall Policy Guidance***

The PSF Board will be responsible for appointing the BUDS-RE Manager. In addition, it will be responsible for the overall policy guidance relating to financial management of the component. The will approve the project implementation manual, including the component's financial management arrangements.

The BUDS-Re Manager will submit to the PSF board regular Annual Work Programs, followed by Quarterly Progress Reports detailing achievement of these programs. The initial Work Program will include specific activities aimed at obtaining wide publicity and exposure for the BUDS-RE scheme to make it known to as many potential recipients as possible. The PSF supervision schedule will link to the IDA supervision schedule.

All applications and rejections by the BUDS-RE will be considered on an ex-post basis by the PSF board to allow it to give guidance on future approvals policy. The PSF board may only revoke an approval already granted by the BUDS-RE manager in the event that fraudulent information is determined to have been provided within an application. The board will meet at least once per operational quarter.

### ***Staffing***

The finance department is headed by the finance manager who is a qualified accountant and also the project coordinator for the Private Sector Competitiveness Project. She is assisted by the project accountant and an accounts assistant. The Finance Manager and the project accountant are appropriately qualified for their roles.

It is recommended that additional staff resources at the level of accounts assistant should be acquired for the ERT component in order to preserve the segregation of duties within the department. Given the role of the BUDS-RE Unit in the determination of the destination of grants under the Scheme, it is also desirable that the staff in that unit should be appointed by the date of **Credit Effectiveness**.

### ***Accounting Policies and Procedures***

The accounting policies and procedures of the Private Sector Foundation are detailed in the Accounting Manual. These are satisfactory for the purposes of this assessment.

### ***Internal Audit***

There is no internal audit function within the PSF organizational structure. This is satisfactory given the small number of transactions that are undertaken by the PSF. However, the option to contract out internal audit services, especially where the need for these is identified, is retained by the PSF management.

### ***External Audit***

The Board of Directors of the PSF appoints auditors annually to undertake the audit of the financial statements of the PSF and to report to its members on whether they give a true and fair view. The auditors are also required under the terms of reference to report to management any internal control weaknesses and other discrepancies identified during the course of the audit.

The Auditor General has the responsibility of auditing all government statutory organizations, including

donor funded projects. The PSF will prepare separate accounts for the ERT project component which it implements and have them audited annually by the Auditor General. A copy of the audit reports will be required to be submitted to IDA not later than 6 months after the end of the financial year. The reports will be in respect of the accounts for the project, Special Account and on the use of the SOE/PMR procedure.

Arrangements for the external audit of the financial statements of the project will be determined and communicated to IDA. The audit report will be submitted to IDA within six months after the end of each financial year. Any firm of auditors subcontracted to carry out the audit should meet the IDA's requirements in terms of independence, qualifications and experience.

The audit reports that will be required to be submitted by the project by 31 December each year are for: the Private Sector Foundation – Entity Accounts; Project accounts; Statements of Expenditure (SOE); and the Special Account.

### ***Information Systems***

PSF accounts are maintained using the PASTEL accounting package. With this software:

- the project can record and report its expenses under the credit categories specified in the Development Credit Agreement;
- expense amounts can be allocated amongst the different funding categories e.g. IDA, GOU. Expenses are therefore traceable to individual funding entities;
- a general ledger is maintained on the system, with printing capabilities for a complete general ledger listing and a monthly trial balance;
- an audit trail is established, as voucher numbers or such other references to supporting documentation are shown in the detailed general ledger listing; and
- the project is able to prepare monthly financial statements and the monitoring of the budget.

### ***Books of accounts and list of accounting codes***

The financial year of the PSF runs from 1 July to 30 June. It should be noted that the accounts for the PSF and the PSF-implemented PSCP for the year ended 30 June 2000 were not submitted within the deadline required in the Development Credit Agreement. The management of the PSF has given assurances to IDA that this situation is not likely to recur. However, IDA will retain the right to pursue remedies within its rights in cases of late submission, including a possible suspension of the disbursement of the Credit.

### ***Financial Reporting***

PSF will periodically submit reports to the MOF on BUDS-RE activities. The reports will contain information on the progress of all of the activities and services, identify problems and recommend solutions. Activity plans will be approved annually by the Bank and the MOF. The reports and plans will incorporate the information provided by the UNBS and the NGOs operating under sub-agreements.

PSF currently produces regular financial reports for management on a weekly and monthly basis. Quarterly, semi-annual and annual reports are also prepared. These reports contain financial information on the transactions of the PSF. The current system of reporting provides a sufficient background to the development of reports required for the project. Formats of the various periodic project financial reports to be generated from the financial management system will be developed. There will be clear linkages between the information in these reports and the Chart of Accounts. The financial reports should be designed to provide quality and timely information to project management, implementing agencies, and various

stakeholders on project performance.

These reports include financial statements (e.g. sources and application of funds; expenditure classified by project components, disbursement categories, expenditure types and implementing agencies, and comparison with budgets; short-term forecasts of expenditure; unit costs for key items and comparison with budgets; etc.). The reports will closely follow sample formats that are given in the World Bank's Loan Administration Change Initiative (LACI) Handbook.

### ***Action Plan***

The action plan below indicates the actions to be taken for the project to achieve eligibility for PMR-based disbursements, and the dates that they are due to be completed by. An IDA team will periodically monitor the achievement of the stated targets.

	<b><u>Action</u></b>	<b><u>Date due by</u></b>	<b><u>Responsible</u></b>
1	Agreement of terms of reference for external audit	31 December 2001	PSF, Bank
3	Updating Financial Management Manual for ERT component	Credit Effectiveness	PSF
4	Recruitment of BUDS-RE staff and accounting assistant	31 December 2001	PSF
5	Development of a Chart of Accounts	Credit Effectiveness	PSF
6	Agreement of financial reporting formats	31 December 2001	PSF
7	Opening Bank Accounts, and preparation of initial cashflows	Credit Effectiveness	PSF

## **BANK OF UGANDA (BOU)**

The effectiveness of BOU's implementation of the IDA funded Enterprise Development Project (EDP) was examined as part of its Implementation Completion Review. Based on interviews with the Ministry of Finance, Planning and Economic Development, EDP and Participating Financial Institutions (PFIs), the ICR mentions that DFD managed the line of credit to the satisfaction of the stakeholders and the implementers. The PFIs reported that BOU had done a good job managing the scheme. The highest ranking of BOU's performance was 'very good' with respect to turn-around time for loans and disbursement rate of approved refinance and 'excellent' for response time to inquiries made by the PFI and its role in monitoring the performance of the sub-projects. DFD received a high ranking with respect to the disbursement procedure. It was concluded from the review that the Loan Supervision Committee (LSC: see below) efficiently processed applications for approved refinance.

### ***Overall policy guidance***

It is intended that the operations of the project for refinancing the Phase I investments agreed at negotiations shall be reviewed from time to time by the Loan Supervision Committee which shall be responsible for:

- laying down guidelines for financial management
- appointment of auditors
- Reviewing audit reports

The Committee is appointed by the Governor, BoU, and is headed by the Executive Director, Finance Function. The membership of the Committee will be boosted for ERT Project discussions to include representation from the Energy ministry and industry. It is planned that the responsibilities of this committee relating to financial management, together with its composition, will be documented in its Terms of Reference and forwarded to IDA for approval by **Credit effectiveness**.

### ***Accreditation of Participating Financial Institutions (PFIs)***

Commercial banks or non-bank institutions acceptable to IDA (such as development finance institutions) which have the highest satisfactory rating of the BOU will be eligible for participation in the IDA refinancing of initial investments. Institutions meeting this criteria and lending for initial investments must sign a Participation Agreement with the BoU to access the refinancing window.

### ***Flow of funds and disbursement arrangements***

The refinance transaction cycle can be summarized as follows:

- 1) Investor will submit an investment project proposal and loan application to the PFI.
- 2) The PFI will appraise the proposal and send a refinancing request to BoU.
- 3) BoU will ensure completeness of process refinance and confirm its eligibility to PFI.
- 4) The PFI will disburse the loan to the investor.
- 5) The PFI will then request for refinance from BoU.
- 6) Once satisfied that the loan was disbursed as sanctioned, BoU will disburse refinance to PFI.

PFIs have the primary responsibility for scrutinising project proposals, sanctioning loans and monitoring their performance.

In scrutinizing proposals, PFIs have to ensure that the conditions of eligibility are fully met with reference to the investor's record, the objectives of the investment, the soundness of the proposal, and most critically the adequacy of the financial and managerial resources of the investor. Once the PFI is satisfied that the proposal is worthy of support under the Project, the PFI proceeds to verify and confirm the data and assumptions in the proposal, forecasts and financial information given in the project report and take up the project proposal for appraisal and sanction.

A refinancing request, including a summary appraisal report, is then submitted by the PFI to BoU. The BoU will ensure that the refinancing request is complete, and forward it to IDA for approval. The summary will include the following:

- PFI assessment of subborrower credit worthiness
- Brief description and appraisal of subproject and procurement methods
- List of goods, works, and services to be financed
- Project costs and financing
- Terms and conditions of subloans
- Timetable for implementation
- Evidence of Environmental and Social Safeguard clearance
- Economic and financial justification for the subproject
- Cash flow projections for subborrower and the subproject
- assessment of technical and commercial feasibility

Before disbursements are made by the PFIs, they will be required to ensure that:

- the expenditure is in accordance with the project estimates and for the purposes approved;
- goods, works and services have been procured in accordance with approved appraisal report;
- goods, works and services are to be used exclusively in carrying out the project;
- a full and complete record of goods has been maintained; and
- all transactions have been properly recorded in the books of accounts of the enterprise to the satisfaction of the PFI.

Once the PFI has made the disbursement of the loan to the investor, a request for refinance will be submitted to BoU following a prescribed format supported by documents, agreements, invoices or utilization certificates as may be prescribed.

The PFI is required to submit to BoU quarterly and monthly reports covering the activities and progress of the investment project in a form prescribed in the guidelines. BoU scrutinizes these reports and communicates its observations to the PFI.

The PFI shall submit a completion and evaluation report on each investment project within one month from the date of completion of the investment project for which a sub-loan has been sanctioned.

Banks are expected to examine the proposals and sanction sub-loans according to their policies and operating procedures. These policies and procedures are examined by the BSD in their assessment of continuing suitability and compliance with the requirements of the Financial Institutions Statute.

Requests for refinance withdrawals from BoU by PFIs will be made in a format prescribed by BoU and included in the participating agreement. Refinance is only by way of reimbursement of the amount

disbursed to the ultimate borrower.

### ***Staffing***

The implementing unit for the project, the DFD, falls under the Executive Director of Finance, BoU. The DFD is headed by a Director and has four divisions:

- The Finance division with responsibility for financial management matters related to projects implemented by DFD;
- The Project Management Division which processes applications from PFIs and related day-to-day matters;
- The Rural Financial Services division charged with developing rural access to financial services, promoting self-help groups in this area and mobilizing rural savings; and
- The Evaluation and Marketing Division which is responsible for monitoring of projects.

The Finance Division is headed by a Deputy Director accountant and also consists of an accounts manager, a project accounting officer a disbursements officer, a loan tracking officer and accounts assistants. The composition of this team is sufficient for the purposes of ensuring that accounting policies and procedures relating to projects in the DFD are properly implemented. In the ICR for the Investment Term Credit Refinance Fund (ITCRF) that was financed under the recently ended Enterprise Development Project (EDP), it was noted that based on the performance of the fund, the competence of the Loan Supervision Committee and overall performance of DFD, the staff, including the Finance Division, is capable of managing lines of credit. The organization of the department and the Finance Division ensures proper segregation of duties relating to the transaction cycle involving the disbursement of funds for sub-projects.

### ***Internal Audit***

The Bank of Uganda has a Chief Internal Auditor who reports to the Governor. The CIA carries out regular internal audit exercises within the Bank and these include the operations under the DFD.

### ***External Audit***

The Auditor General is primarily responsible for the auditing of all statutory organizations, including the Bank of Uganda. The audit of projects implemented by DFD is usually subcontracted to a firm of private auditors which should meet the IDA's requirements in terms of independence, qualifications and experience. The final audit report is issued by the Auditor General based on the tests carried out by the subcontracted firm. It is planned that a similar arrangement will be put in place for the ERT component.

The Project Agreement will indicate that the accounts for the component should be audited and submitted to IDA within six months of the end of each financial year, in accordance with IDA general practice. In addition to the accounts for the project, Special Account and on the use of the SOE/PMR procedure, the accounts for the BOU entity will be required to be submitted each year under the project agreement.

DFD plans to draw up appropriate Terms of Reference for the audit and to agree these with IDA by Credit effectiveness.

No significant issues have been identified in the audit reports for Bank of Uganda or the IDA funded projects implemented by DFD over the last three years.

### ***Information Systems***

The DFD maintains separate accounts for each of the projects it implements. The accounts will be maintained using the Navision Financials software package. This software has been assessed as sufficient for the purposes of the project.

### ***Financial Management Manual***

An accounting manual exists which documents the accounting system and procedures that were employed by the DFD for the ITCRF under the EDP. Similar procedures will be used for the ERT component and there are plans to update the manual to reflect changes required under the component. The updated manual will document the financial management system and will be used by: IDA to assess the acceptability of the project accounting, reporting and control systems; staff as a reference manual; and by the auditors to assess project accounting systems and controls and in designing specific project audit procedures.

The updated accounting manual will cover aspects of the financial management system including: Flow of Funds; Financial and Accounting Policies for the Project; Accounting System (including centers for maintenance of accounting records, Chart of Accounts, formats of books and records, accounting and financial procedures) ; Authorisation procedures for transactions; Budgeting System; Financial Forecasting System; Procurement And Contract Administration Monitoring System; Financial Reporting (including formats of reports, linkages with Chart of Accounts and procedures for reviewing financial information); and Human Resource Aspects

In addition, the updated accounting manual will document the arrangements that have been made for recording project impacts, outcomes, outputs, and inputs that are required to assess progress toward the achievement of project objectives. It will also document the procedures undertaken for the replenishment of the Special Account.

The update of this manual will be done by the DFD. A draft copy should be submitted for review by the IDA by 30 September 2001 and should be finalized after incorporating the comments of IDA by **Credit effectiveness**.

### ***Action Plan***

The action plan below indicates the actions to be taken for the project to achieve eligibility for PMR-based disbursements, and the dates that they are due to be completed by. An IDA team will periodically monitor the achievement of the stated targets.

	<b><u>Action</u></b>	<b><u>Date due by</u></b>	<b><u>Responsible</u></b>
1	Agreement of terms of reference for external audit	31 December 2001	BOU
2	Documentation of composition and responsibilities of the Loan Supervision Committee with respect to the ERT.	Credit effectiveness	BOU
4	Preparation of Financial Management Manual describing accounting systems and procedures, internal controls, funds flow processes and books of accounts to be maintained: <ul style="list-style-type: none"> <li>• First draft</li> <li>• Final draft incorporating IDA comments</li> </ul>	31 December 2001 Credit effectiveness	BOU; Bank to review
6	Agreement on financial reporting formats	31 December 2001	BOU, Bank
7	Opening Bank Accounts, and preparation of initial cashflows	Credit effectiveness	BOU



**Annex 7: Project Processing Schedule**  
**UGANDA: Energy for Rural Transformation Project**

<b>Project Schedule</b>	<b>Planned</b>	<b>Actual</b>
<b>Time taken to prepare the project (months)</b>		
<b>First Bank mission (identification)</b>		06/20/1999
<b>Appraisal mission departure</b>	04/15/2001	04/23/2001
<b>Negotiations</b>	09/24/2001	09/24/2001
<b>Planned Date of Effectiveness</b>	01/01/2002	

**Prepared by:**

The design and preparation of this project has been carried out by a Bank led cross-sectoral team (identified below), working in a close partnership with and the active involvement of a number of Government Ministries --Energy and Minerals Development, Local Government, Health, Agriculture, Education, Uganda Communication Commission-- the Uganda Local Authorities Association and NGOs notably ACTIONAID Kampala supported by regional NGOs/CBOs.

**Preparation assistance:**

The Project design and preparation have benefited tremendously from the inputs of a large number of stakeholders --local Government, private sector, community discussions, and donor agencies in Uganda during the course of visits to over 25 districts in Uganda; including consultations with over 150 stakeholders who attended a one-day national workshop held in June 1999 in Entebbe (see section D4), and frequent discussions during preparation missions with multilateral donor agencies in Kampala, including UNICEF, UNDP, WHO, and bilateral assistance program officers, including Sweden, Denmark, Netherlands, Norway and DFID.

The bulk of the preparation costs for this project were financed through the Africa Rural and Renewable Energy Initiative (AFRREI), a donor supported program in the Africa Energy Unit (AFTEG), launched with support from the Government of Denmark, and subsequently additional support from the Government of Sweden and Norway. This assistance is gratefully acknowledged.

**Bank staff who worked on the project included:**

<b>Name</b>	<b>Speciality</b>
	The Project Team included Bank Staff and Consultants
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Malcolm Cosgrove-Davies	Senior Energy Specialist
Subodh Mathur	Senior Economist, Consultant
Sten Bergman	Senior Power Engineer
Trine Refsbaek	Cross-sectoral Expert
Robert Schware	Lead Telecoms Specialist
Vivien Foster	Telecoms Expert
Philip Gowers	Lead Health Specialist
Peter Okwero	Health Specialist

Joseph Kizito	Financial Management Specialist
Arne Dalfelt	Senior Environmental Specialist
Kristine Ivardotter	Senior Social Development Specialist
Modupe Adebawale	Senior Financial Management Specialist
Aberra Zerabruk	Senior Counsel
Rogati Kayani	Senior Procurement Specialist
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Karl Jechoutek	Advisor (through PCD)
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Ernie Terrado	Principal Renewable Energy Specialist
Louis Pouliquen	ex-Bank Director of Infrastructure, Consultant
Peter Scherer	ex-Bank Division Chief for Telcoms and Energy
Quality Enhancement Review (QER) Panel	
Commissioned by Jamal Saghir, Director Energy & Water Sector Board	
Jonathan Brown	Operations Adviser, (AFTQK/ACT Africa) Chair
Nwanze Okidegbe	Adviser, RDV
Onno Ruhl	Lead Private Sector Development Specialist (AFTPS)
Richard Stern	Former World Bank Vice President and Director of Energy Department
International Consultants:	
Michael Bess	East African Renewable Energy Economist and Planner
Robert Chronowski	Grid-Connected Renewable Energy Program Development Specialist
James Finucane	Rural Business and Solar Market Development and Financial Intermediation Specialist
Steven Ferrey	Counsel
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Patrick Barugahare	Lawyer
Luka Abe	Capacity Building
Herbert Dusabe	Lawyer
Geoffrey Kitakule	Financial Analyst/Modeller
Gloria Kempaka	Economist

ACTIONAID UMACIS REDC	NGO Business Development Services CBO
-----------------------------	---

## **Annex 8: Documents in the Project File\***

### **UGANDA: Energy for Rural Transformation Project**

#### **A. Project Implementation Plan**

#### **B. Bank Staff Assessments**

AFRREI: Health and Energy Note: Improving Rural Health Service Through Increased Access to Energy. July 2000.

AFRREI: Education and Energy Note: Improving the Quality of Rural Educational Institutions via Electricity and Communication Services. May 2000

AFRREI: A Proposal Seeking Grant Support for Kisiizi Telecenter Pilot Project under the aegis of the Uganda: *Energy for Rural Transformation* Project. December 2000.

AFFREI: Information and Communications Sector. Trip Report. October 2000

Carl Bro A/S : Energy needs in Rural Health Care Facilities - a missing link for improved health care service. An assessment of the energy needs and its contribution to improved Health Care Service in Uganda. Consultant Report for WB. January 2001.

Wolfgang Mostert(Bank Consultant): Rural and Renewable Energy Strategy...?????

Mike Bess (Bank Consultant): Documents for West Nile Concession Tender, January 2001:

i) Concession Agreement for the Production, distribution and sales of Electric Power in the West Nile Region.

ii) Annex A: West Nile Valuation of Existing Assets and short Term Investment Plan

iii) Annex B: Draft Sale and Purchase Agreement for UEB Assets in West Nile Region

iv) Annex C: Draft Generation License

v) Annex D: Draft Distribution and Sales License

vi) Annex E: Draft Construction and Lease-Purchase Agreement for Arua-Nebbi 33KV

Sub-transmission Line

vii) Annex F: Prototype Carbon Fund Financing

viii) Annex G: Draft Proforma Business Plan

ix) Annex H: Energy Demand and Electricity Load Profile of West Nile - Methodology and Synthesis Report.

UMACIS consultants: An Analysis of the Demand for Electricity in Rural Uganda, October 1999.

#### **C. Other**

\*Including electronic files

**Annex 9: Statement of Loans and Credits**  
**UGANDA: Energy for Rural Transformation Project**

Project ID	FY	Purpose	Original Amount in US\$ Millions			Cancel.	Undisb.	Difference between expected and actual disbursements <sup>a</sup>	
			IBRD	IDA	GEF			Orig	Frm Rev'd
P002984	2002	FOURTH POWER PROJECT	0.00	62.00	0.00	0.00	59.78	0.00	0.00
P065436	2002	2ND PHASE OF THE RD. DEVELOPMENT	0.00	64.52	0.00	0.00	63.39	0.00	0.00
P044695	2001	PROGRAM	0.00	45.00	0.00	0.00	44.22	0.00	0.00
P050438	2001	National Agric. Advisory Services Proj.	0.00	150.00	0.00	0.00	146.45	0.00	0.00
P050439	2001	Uganda PRSC 1	0.00	48.50	0.00	0.00	44.41	15.85	0.00
P070627	2001	PRIVATIZATION & UTILITY SECTOR REFORM	0.00	20.00	0.00	0.00	19.42	0.42	0.00
P073089	2001	Regional Trade Fac. - Uganda	0.00	22.00	0.00	0.00	21.42	6.99	0.00
P072482	2001	EMCBP II	0.00	47.50	0.00	0.00	45.47	7.45	0.00
P044679	2000	HIV/AIDS Control Project	0.00	34.04	0.00	0.00	26.35	10.83	0.00
P002992	2000	Second Economic and Fin. Mgmt. Project	0.00	80.90	0.00	0.00	62.58	-9.89	0.00
P002941	1999	LOCAL GOV DEVE.PROGRAM	0.00	12.40	2.00	0.00	3.13	1.52	0.00
P059223	1999	ICB-PAMSU	0.00	22.40	0.00	0.00	17.05	15.35	0.00
P059127	1999	NAKIVUBO CHANNEL REH	0.00	26.00	0.00	0.00	20.49	5.94	0.00
P002970	1999	AGRIC.RES & TRNG. II	0.00	90.98	0.00	0.00	80.21	16.16	0.00
P049543	1998	ROADS DEVT PROGRAM	0.00	30.00	0.00	0.00	20.80	23.34	0.15
P057007	1998	ROAD SECT/INST.SUPP	0.00	27.60	0.00	0.00	22.77	24.49	-3.05
P040551	1998	EL NINO EMERG RD REP	0.00	34.00	0.00	0.00	17.49	3.97	0.00
P046870	1997	NUTRIT.CHILD DEV	0.00	9.80	9.80	0.00	3.92	2.89	0.00
P046836	1997	LAKE VICTORIA ENV.	0.00	12.10	0.00	0.00	2.91	1.34	0.00
P002987	1997	LAKE VICTORIA ENV.	0.00	125.00	0.00	0.00	18.67	-0.46	6.06
P035634	1996	SAC III	0.00	12.30	0.00	2.18	1.78	5.27	1.29
P002971	1995	PRIV. SECTOR COMPETI	0.00	45.00	0.00	0.00	2.70	1.95	0.00
P002976	1995	DISTRICT HEALTH	0.00	36.40	0.00	0.00	1.44	3.90	0.00
P002963	1994	INST. CAPACITY BLDG	0.00	50.00	0.00	0.00	2.55	3.45	0.00
P002957	1994	SEXUAL.TRANS.IN	0.00	42.30	0.00	0.00	4.22	5.24	0.00
P002929	1991	SMALL TOWNS WATER UG POWER III	0.00	125.00	0.00	0.00	11.82	-15.24	425.23
Total:			0.00	1275.74	11.80	2.18	765.45	130.76	429.68

UGANDA  
STATEMENT OF IFC's  
Held and Disbursed Portfolio  
May-2001  
In Millions US Dollars

FY Approval	Company	Committed				Disbursed			
		IFC				IFC			
		Loan	Equity	Quasi	Partic	Loan	Equity	Quasi	Partic
1998	AEF Skay Electro	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1994	AEF Skyblue	0.51	0.00	0.00	0.00	0.51	0.00	0.00	0.00
1998	AEF White Nile	0.28	0.00	0.00	0.00	0.28	0.00	0.00	0.00
1999	AEF Wstern Hgh	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2000	CelTel Uganda	4.00	0.70	0.00	0.00	2.40	0.70	0.00	0.00
1994	CelTel	0.43	0.64	0.80	0.00	0.43	0.64	0.80	0.00
1984/92	DFCU	0.00	0.60	0.00	0.00	0.00	0.60	0.00	0.00
1993	Jubilee	0.00	0.10	0.00	0.00	0.00	0.10	0.00	0.00
1996	Kasese Cobalt	12.00	3.60	0.00	0.00	12.00	3.60	0.00	0.00
1998	Tilda Rice	2.28	0.00	0.00	0.00	1.78	0.00	0.00	0.00
1995/96	Uganda Leasing	0.98	0.00	0.00	0.00	0.38	0.00	0.00	0.00
1983	Uganda Sugar	5.08	0.00	0.00	0.00	5.08	0.00	0.00	0.00
1996	AEF Agro Mgmt	0.60	0.40	0.00	0.00	0.55	0.40	0.00	0.00
1992	AEF Clovergem	0.84	0.00	0.00	0.00	0.84	0.00	0.00	0.00
1997	AEF Conrad Plaza	1.13	0.00	0.00	0.00	1.13	0.00	0.00	0.00
1998	AEF Exec. Invmnt	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
1999	AEF Gomba	1.40	0.00	0.00	0.00	1.40	0.00	0.00	0.00
2001	AEF Kabojja	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1998	AEF Kampala Flwr	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2000	AEF Kasambya	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	AEF Kiwa II	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1997	AEF Ladoto	0.80	0.00	0.00	0.00	0.80	0.00	0.00	0.00
2000	AEF LongFreight	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2000	AEF Mosa Court	0.64	0.00	0.00	0.00	0.64	0.00	0.00	0.00
1998	AEF Nile Roses	0.16	0.00	0.00	0.00	0.16	0.00	0.00	0.00
1993	AEF Rainbow	0.79	0.00	0.00	0.00	0.79	0.00	0.00	0.00
1995	AEF Rwenzori	0.35	0.00	0.00	0.00	0.35	0.00	0.00	0.00
1993									
Total Portfolio:		36.63	6.04		0.80	0.00	30.52	6.04	0.80

FY Approval	Company	Approvals Pending Commitment			
		Loan	Equity	Quasi	Partic
1998	AEF Ram Oil	1.00	0.00	0.00	0.00
Total Pending Commitment:		1.00	0.00	0.00	0.00

## Annex 10: Country at a Glance

### UGANDA: Energy for Rural Transformation Project

POVERTY and SOCIAL	Uganda	Sub-Saharan Africa	Low-income
<b>1999</b>			
Population, mid-year ( <i>millions</i> )	21.5	642	2,417
GNP per capita ( <i>Atlas method, US\$</i> )	320	500	410
GNP ( <i>Atlas method, US\$ billions</i> )	6.8	321	988
<b>Average annual growth, 1993-99</b>			
Population (%)	2.9	2.6	1.9
Labor force (%)	2.7	2.6	2.3
<b>Most recent estimate (latest year available, 1993-99)</b>			
Poverty (% of population below national poverty line)	44	..	..
Urban population (% of total population)	13	34	31
Life expectancy at birth ( <i>years</i> )	42	50	60
Infant mortality ( <i>per 1,000 live births</i> )	97	92	77
Child malnutrition (% of children under 5)	26	32	43
Access to improved water source (% of population)	41	43	64
Illiteracy (% of population age 15+)	38	39	39
Gross primary enrollment (% of school-age population)	122	78	96
Male	129	85	102
Female	114	71	86

Development diamond\*

Life expectancy

GNP per capita

Gross primary enrollment

Access to safe water

Uganda

Low-income group

KEY ECONOMIC RATIOS and LONG-TERM TRENDS	1979	1989	1998	1999	
GDP ( <i>US\$ billions</i> )	..	5.3	6.8	6.4	
Gross domestic investment/GDP	..	11.1	15.0	16.4	
Exports of goods and services/GDP	..	8.0	10.3	11.3	
Gross domestic savings/GDP	..	1.0	5.6	4.9	
Gross national savings/GDP	..	1.9	13.4	10.5	
Current account balance/GDP	..	-6.9	-10.4	-11.6	
Interest payments/GDP	..	..	0.6	0.6	
Total debt/GDP	..	36.2	53.6	54.3	
Total debt service/exports	..	..	25.5	23.1	
Present value of debt/GDP	..	..	35.0	27.3	
Present value of debt/exports	..	..	350.6	225.3	
	<b>1979-89</b>	<b>1989-99</b>	<b>1998</b>	<b>1999</b>	<b>1999-03</b>
( <i>average annual growth</i> )					
GDP	3.4	7.1	5.6	7.4	6.3
GNP per capita	0.9	4.1	2.8	4.3	3.3
Exports of goods and services	1.2	14.8	-14.9	33.0	6.4

Economic ratios\*

Trade

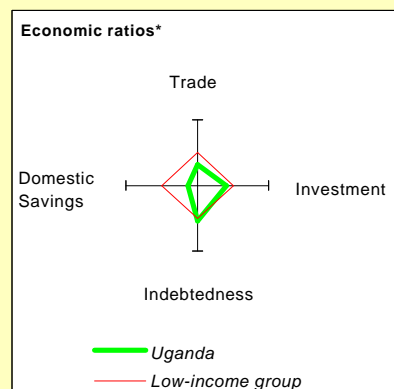
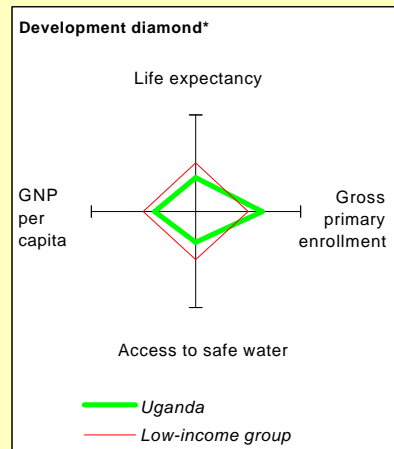
Domestic Savings

Investment

Indebtedness

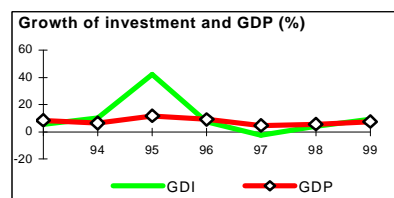
Uganda

Low-income group



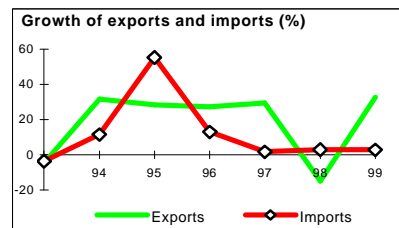
#### STRUCTURE of the ECONOMY

	1979	1989	1998	1999
(% of GDP)				
Agriculture	..	56.8	44.6	44.4
Industry	..	10.7	17.6	17.8
Manufacturing	..	5.9	8.9	8.7
Services	..	32.5	37.8	37.8
Private consumption	..	92.0	84.8	85.2
General government consumption	..	7.0	9.6	9.9
Imports of goods and services	..	18.1	19.7	22.9



#### (average annual growth)

	1979-89	1989-99	1998	1999
Agriculture	2.7	3.7	1.9	6.9
Industry	6.4	12.1	11.5	9.1
Manufacturing	3.6	13.5	14.4	11.3
Services	3.2	8.1	6.6	7.2
Private consumption	3.4	6.3	8.6	0.8
General government consumption	0.6	8.2	8.0	17.4
Gross domestic investment	13.1	8.2	3.7	9.0
Imports of goods and services	7.3	9.0	3.1	2.8
Gross national product	3.5	7.3	5.8	7.3



Note: 1999 data are preliminary estimates.

\* The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

## PRICES and GOVERNMENT FINANCE

**Domestic prices**

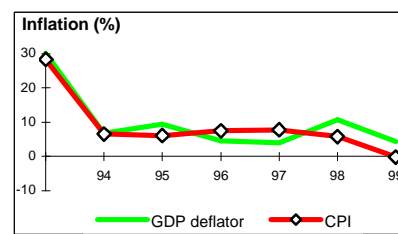
(% change)

	1979	1989	1998	1999
Consumer prices	..	131.0	5.8	-0.2
Implicit GDP deflator	..	115.4	10.7	4.4

**Government finance**

(% of GDP, includes current grants)

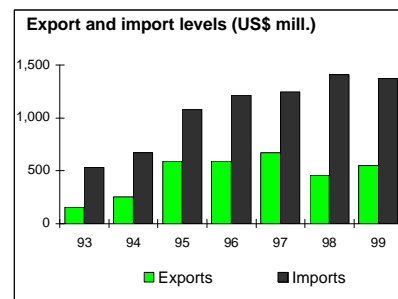
Current revenue	..	5.5	10.3	10.9
Current budget balance	..	-1.3	0.9	0.9
Overall surplus/deficit	..	-4.8	-5.6	-5.9



## TRADE

(US\$ millions)

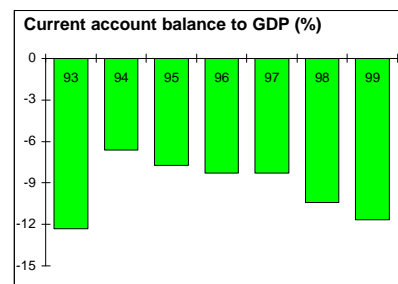
	1979	1989	1998	1999
Total exports (fob)	..	282	458	549
Coffee	..	276	269	307
Cotton	..	..	11	11
Manufactures	..	..	..	..
Total imports (cif)	..	562	1,411	1,376
Food	..	..	..	..
Fuel and energy	..	76	84	65
Capital goods	..	..	..	..
Export price index (1995=100)	..	92	74	67
Import price index (1995=100)	..	79	106	101
Terms of trade (1995=100)	..	117	70	67



## BALANCE of PAYMENTS

(US\$ millions)

	1979	1989	1998	1999
Exports of goods and services	..	304	634	726
Imports of goods and services	..	712	1,871	1,834
Resource balance	..	-408	-1,237	-1,107
Net income	..	-66	-9	-14
Net current transfers	..	114	539	375
Current account balance	..	-360	-706	-746
Financing items (net)	..	342	840	780
Changes in net reserves	..	18	-134	-33

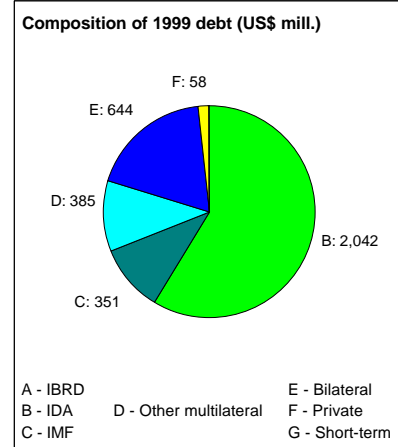
**Memo:**

Reserves including gold (US\$ millions)	..	46	750	748
Conversion rate (DEC, local/US\$)	..	170.4	1,149.7	1,362.0

## EXTERNAL DEBT and RESOURCE FLOWS

(US\$ millions)

	1979	1989	1998	1999
Total debt outstanding and disbursed	..	1,903	3,631	3,480
IBRD	..	24	0	0
IDA	..	605	1,971	2,042
Total debt service	..	..	172	179
IBRD	..	5	0	0
IDA	..	5	24	25
Composition of net resource flows				
Official grants	36	177	433	277
Official creditors	..	..	220	188
Private creditors	..	0	1	4
Foreign direct investment	2	2	200	230
Portfolio equity	..	0	0	0
World Bank program				
Commitments	0	141	172	267
Disbursements	..	100	242	148
Principal repayments	..	4	10	10
Net flows	..	96	231	138
Interest payments	..	6	14	15
Net transfers	..	90	217	123





## **Additional Annex 11**

### **GEF Incremental Cost Annex Incremental Costs and Global Environmental Benefits**

#### **Introduction**

This is the first project to be prepared in the context of the **World Bank/Global Environment Facility Strategic Partnership for Renewable Energy**. The key features and operational modalities of the Partnership embodied in this project are:

- **Increase in GEF resources with significant leveraging.** The GEF related targets in this project are ambitious, and the GEF contribution proposed in this project is one of the highest for the World Bank's operations in the sub-Saharan Africa region (see also the PCD section F *Sustainability and Risks* and the section later in this annex for a discussion about sustainability). At the same time, there is significant leveraging of GEF resources, particularly for the investment components, where the GEF incremental costs are expected to decline over time.
- **Long-term orientation with a focus on the private sector.** In this project, there is a long-term orientation, targeted at building effective bridges to private sector market development and financing capabilities to ensure commercial sustainability. The Bank's lending instrument for this project is an Adaptable Program Loan (APL). Instead of an ex-ante definition of the entire project and a linear implementation path, this APL: (i) provides phased and sustained implementation support for long term development of technologies and markets; (ii) at the private sector level, provides different entry points to encourage investment in market development, and permits a logical maturation to commercial delivery and finance mechanisms, and (iii) includes financial resources for an increased level of pre-investment studies that would lead to a long-term private sector investment pipeline.
- **Creation and utilization of country-based Intermediaries:** To overcome constraints in the Bank's capacity to oversee a growing number of individual project transactions, as well as to increase the commitment and in-country "ownership" of renewable energy development, this project will develop new intermediary entities that would identify and appraise renewable energy projects with the Bank playing a capacity building and oversight role. The role of the WBG-GEF would be to provide assistance to help select appropriate intermediaries, establish sub-project selection/appraisal criteria, assess the capacity of potential intermediaries, build the capacity of intermediaries, and undertake ex-post verification.
- **Retain incremental cost and operational strategy principles.** This project is firmly rooted in Operational Program 6, and the incremental cost calculations are in line with the conventional methodology. This annex describes the approach to assessing and provides initial estimates of the incremental costs associated with global environmental benefits and GEF co-financing of this project. The incremental cost estimates for Phases II and III are estimates, and will be revised prior to the time that these becomes operational, taking account of the actual situation at that time (see Box 1).

At present, the **power sector in Uganda is in a state of transition**, moving from a state-owned vertically-integrated power utility to a competitive, unbundled, privatized mode, with transmission being

retained as a monopoly (see PAD Section B2a). This shift has direct implications for renewable energy small-scale power producers (SPPs), as, over time, these SPPs will no longer be able to sell their power to “the power utility,” but would instead have to sell either directly to individual large consumers or to distribution companies under a “Multiple Buyer, Multiple Seller” model. In the long run, the sale of power *from small, renewable energy resources*, such as sugar mills, that are close, or already connected, to the main grid, would be to third-party customers *via* wheeling through the main grid, i.e., in the long run, there would be no power purchase agreement between the generator and the main grid, which would merely serve, for a fee, as the “highway” over which power is transported from the generator to a third-party customer. However, in the short run until the Bujugali project comes online, there will be a power purchase agreement between the main grid operator and the renewable energy power generators.

#### **Box 1 Phasing and processing of APL**

This 10-year APL program is divided into three phases (see PCD section A.) During project preparation, Phase I will be designed in detail along with more general designs and triggers for release of the second and third phases. In keeping with the Bank’s APL procedures, this document describes Phase I of the program, including triggers for moving to subsequent phases (see PCD Section 4), and provides indicative cost estimates for Phases II and III. Detailed design of subsequent phases, including detailed incremental cost analyses, will be completed prior to their implementation for review and approval by Bank and GEF management.

It is proposed that the processing of this project be based on parallel GEF/Bank approval of an initial tranche within a defined funding envelope. The overall cost, implementation period, cost-benefit justification, financing plan, and general description of program activities will be developed and agreed up-front with the Government of Uganda, and approved during Bank Board consideration of the first phase loan, which is well defined. Subsequent loan releases would be approved by the relevant World Bank Regional Vice President within the funding and timing parameters defined in the program and are based on performance and progress toward agreed program goals. It is proposed that corresponding GEF tranches be released according to similar, pre-established criteria.

### **Broad Development Goals**

**The purpose of the proposed long-term program is to develop Uganda’s rural energy and information/communication technologies (ICT) sectors - with the focus on the energy sector - so that they make a significant contribution to bringing about rural transformation,** i.e., these sectors facilitate a significant improvement in the productivity of rural enterprises as well as the quality of life of rural households. For this to happen, the rural energy and ICT sectors have to selectively build and exploit synergies between cross-sectoral assets in energy and ICT on the one hand, and, on the other hand with end-user sectors such as health, education, agriculture, water and SMEs, (see PAD section B3, *Strategic choices*), while avoiding unnecessary inter-sectoral linkages that may spread implementation difficulties in one sector to other sectors also.

The central objective of the first phase is to put in place “on-the-ground” a functioning conducive environment and related capacity for commercially oriented service delivery of energy and ICTs and small-scale renewable energy power generation by private enterprises, which can effectively support scale-up of electricity to underserved areas and on a sustainable basis. In addition, in the energy sector,

there would be limited investment, treating each sub-project on a case-by-case basis, to test (and refine, as necessary) and prove the readiness of business models and associated support systems for commercially oriented rural electrification and for meeting essential community needs, for scaled-up delivery in subsequent phases. For the ICT sector, where the institutional framework is relatively more ready, the main activities will be support for the Government's program for accelerated rural access to basic telephone service and the spread of Internet to district capitals, with a few pilot telecenters in deep rural areas.

The global objective of the proposed program is contribute to global environmental protection by promoting the use of stand-alone solar photovoltaic (PV) systems and the generation of conventional power from small renewable energy resources.

### **Barriers to renewable energy development and barrier removal strategy**

Uganda is at a very early stage in renewable energy development, even after taking account of the results of the ongoing UNDP-GEF solar pv project. At present, the critical barriers that impede renewable energy development are:

- **Renewable energy resource data are not readily available.** While it is widely accepted that Uganda is well endowed with exploitable renewable resources, including biomass, hydro, solar, geothermal and possibly even wind, the detailed resource assessment information required to prepare specific projects is not readily available.
- **Capacity to promote renewable energy as well as identify, prepare, and appraise projects is inadequate.** There is a critical lack of adequate local capacity to develop renewable energy projects, with significant needs in all areas such as project identification, technical design, and managerial.
- **Regulatory environment and financing intermediation mechanisms are inadequate.** While Uganda is making changes in the power sector structure, at present, the regulatory environment needed to independent grids, many of which would generate power from renewable energy resources, is still to be developed. Further, the overall weakness in the financial sector makes it difficult for renewable energy developers to get adequate financing.
- **Costs are high and product range is limited for solar pv products.** At present, costs in Uganda are much higher than in Asian countries for comparable systems, and the range of products available is not wide enough to meet the needs of the potential consumers.

The requested GEF support for rapid energy transformation that includes a significantly increased use of renewable energy technologies is predicated on the costs of reducing existing market barriers to RET commercialization: These barrier removal costs include:

#### ***Institutional***

- Improve institutional and regulatory capabilities for this new type of business by educating GOU officials at the central government and municipal levels and the private sector on the benefits of creating a sustainable market for energy services in dispersed areas, using least-cost, environmentally clean technologies where available and appropriate.

- Remove capacity and institutional barriers through support to regulatory bodies (for the light-hand regulation support, tariff advice, and dissemination of learning from pilots).
- Perform technical assistance work and information dissemination to overcome both real and perceived increased technology risks, and to address limited customer awareness and residual expectations regarding grid service.

### *Financial*

- Address the up-front capital cost investment requirements and initial transactions costs to encourage entrepreneur activity in developing local hydro and biomass generators for sale to the grid and to local isolated small grids by provision of ‘smart subsidies’ to businesses and to reduce initial higher costs to households for shifting from traditional fuel use to SHS use.
- Reduce entrepreneur risks to market entry by facilitating critical mass for business and attracting larger, better organized private companies with own sources of financing
- Providing seed capital for additional projects (and potentially guarantees and contingent grants for pre-feasibility and feasibility work).

### *Business*

- Demonstrate multiple renewable energy technologies as a basis for initial market entry across several rural regions far from the grid to demonstrate technology performance, project organizations and business models responsive to the new power law
- Facilitate availability of smaller systems and services better aligned with customer needs and ability to pay.
- Assist in establishing adequate delivery model and standards for rural and renewable energy service delivery that ensure quality equipment and services to consumers.
- Actively assist in implementation of the private power law through tangible hardware installations and financing arrangements that assure service for rural areas while implementing the concepts of ‘light regulation’ and local variable tariffs that assure a fair return to investors while minimizing use of and reliance on concessional support.

### **The Baseline**

Without GEF participation, the Energy for Rural Transformation project could still proceed, but it would do so without a focus on renewable energy. This baseline would be characterized by:

- **Widespread use of diesel generation for rural electrification.** Diesel power generation would remain the technology of choice for remote power applications. The expanded coverage envisioned by the program would mean substantial increase in the use of diesel in rural areas.
- **Continued reliance on 19th century energy** - The majority of dispersed area households will rely on low quality traditional energy forms (with some served with diesel generation). For lighting, this will generally be by use of kerosene in inefficient wick lamps, and dry cells will be used for torches and radios. The local solar PV will remain small with limited penetration in rural areas with limited entrepreneurial skills, little replication, and relatively high prices. While the industry has shown some initial gains from the existing UNDP solar program in terms of increased customer awareness, this has not yet translated into a measurable increase in sales, and commercial activity outside of Kampala remains limited. Current sales of about 500 SHS per year will likely not reach beyond 10,000 systems over the project’s 10 year period.

- **Virtually no local capacity for renewable energy project identification, design, and implementation** - Due to various market barriers, investment in renewable energy projects will be rare, allowing little or no appreciable creation of local project development capacity. As a result, the scale and experience base of technology development will remain low and the rural areas will suffer from an acute lack of locally-based equipment vendors, systems integrators, and affordable supply options.
- **CO2 emissions for the country will continue to grow**, and (with the exception of growth in large scale hydro resources which will not be provided to most rural areas in the foreseeable future) will be driven by a primarily fossil-fuel based energy path for the country.

### **The Alternative (The Project)**

The proposed alternative consists of a multiple technology approach, integrated over time into local economic and business development, with a range of activities to remove market barriers of high first-cost, lack of information, and lack of appropriate institutional capacity, and provide maximum responsiveness to the opportunities offered under the private power and restructuring regime now beginning to emerge in the country. The project approach will:

- **Support and accelerate entry of private power producers with technical and financial assistance**, facilitating third-party transactions via wheeling through the main grid, with concessional support to encourage renewable energy technologies and fuels where available and appropriate;
- **Facilitate development of independent grids to stimulate local agricultural and business development**, again with renewables where appropriate, where the risk of market entry would otherwise remain too high.
- **Support rapid development of local PV markets**, including an initial per-watt subsidy to reduce first costs for consumers and stimulate sales, concessional support to 'institutional' systems in schools, health facilities, and community centers to establish a local hardware and service 'anchor' for additional local sales, establishing low cost supply linkages (initially with Asian equipment), and introduction of smaller, more affordable systems more suited to customer needs.

### **Incremental Cost Summary**

With regard to the GEF-related components of the proposed ERT program, the baseline and GEF alternatives are described below:

#### **Component 1 – Main Grid Related Power Distribution And Generation**

In the **Baseline case**, the current severe capacity constraints would result in a continued reliance on diesel for standby generation and, in cases where the unreliability of the main grid seriously disrupts the industrial process, as full-time generation. This capacity constraint would be abruptly lifted when the Bujagali plant is commissioned, at which point grid-tied diesels would be taken out of full-time service, but retained for emergency supply. This assumes that distribution system repair and upgrades are timed to allow full uptake of the newly available power. Sugar mills would expand their operations only enough to provide

power for self-generation, and would not produce excess power for sale. Local capacity to develop renewable energy generation (biomass, mini-hydro, wind, geothermal) projects would remain weak.

For the sugar mill, the base case would include cogeneration capacity expansion by 4 MW to provide 7 MW of capacity for plant use. Diesel generation of 7 MW would be installed by industrial facilities which could not receive adequate UEB supplies. The investment, operation and maintenance costs of this base case option are estimated at \$ 20.55 million over a 20 year analysis horizon.

For distribution, the baseline case would be slow expansion of the distribution system until sufficient connected capacity exists to serve existing customers as well as new customers. All expansion of the main grid prior to commissioning of new hydro capacity would require new fossil-powered generation. A 4 MW diesel unit, connected to the main grid would have a base case cost of about \$11.0 million over 20 years.

The first phase **GEF Alternative** would include: i) expansion of generating capacity at one sugar mill by 14 MW, of which 3 MW would replace their existing capacity, a maximum of 7 MW would be sold to the main grid operator, under a Power Purchase Agreement, for six peak hours per day, and the remaining capacity would be for their own use, and ii) a mini-hydro (5 MW) in the IFC-supported investments in Bushenyi and Rukungiri. Capacity building is described separately below. Phases II & III of the ERT program would include additional mini-hydro and biomass investments, as well as wind and/or geothermal investments if initial investigations identify attractive candidates.

The 20 year costs for the GEF-supported sugar mill are estimated to be \$23.85 million, which yields an incremental cost of \$ 3.3 million; the 20 year costs for the GEF-supported mini-hydro are estimated to be \$ 12.3 million, which yields an incremental cost of \$ 1.3 million.

Phases II and III would have similar baselines on a unit capacity basis, but for a greater installed capacity (19 MW in Phase 2, 23 MW in Phase III). Also, the incremental cost would decrease in successive phases, as shown in the table below.

## **Component 2 – Independent Grid Systems**

**Baseline case** - With appropriate assistance in areas such as creation of an enabling regulatory environment, business development, design, and financing, the growth of independent mini-grids would be slow at first, but then expand rapidly as the concept became accepted. The existing trend in Uganda (and worldwide) is to use diesel gensets for such applications. Thus the base case is that remote diesel gensets would become a common sight in rural Uganda.

For independent grid systems, such as at Kisizi, the base case would be expanded use of diesel gensets for productive uses, and continued use of kerosene, automotive batteries, and traditional fuels at the household level. In total, for five such systems, the base case cost is estimated at \$4 million.

The **GEF Alternative** would include significant emphasis on renewable energy options, with an especially strong focus in the early years of the program when trends are being set. GEF support would include both capacity building and catalytic subsidies for initial renewable energy investments to overcome the high perceived risk of these vanguard projects. Proven technologies, such as small-, mini-, and micro-hydro would be promoted, as well as biomass gasification if the pilots in Phase I are successful.

The GEF costs for the Phase I investments are estimated at \$5.0 million, which yields an incremental cost of \$ 1 million. In Phase II it is anticipated that 10 independent grids with renewable energy generation

would be installed, and 21 such isolated grids would be installed in Phase III. Again, the incremental cost per installed system would decline through the 10 year period as shown in the table below.

### **Component 3 – *Individual/Institutional Solar PV Systems* -**

The base case would build on the market development gains over the past several years which have now brought the solar PV market to about 500 systems per year. This market would grow slowly but steadily, reaching an aggregate of about 10,000 systems in 10 years. Some institutional systems would be installed on the basis of available donor funds, with widely varying technical standards, resulting in operation and maintenance difficulties. There would be no additional technical assistance targeted at solar market development. Households customers would continue to use kerosene for lighting and automotive batteries for operating small appliances such TV and radios, and rural businesses would continue use of diesel gensets. The base case cost is estimated at \$9.3 million.

The GEF alternative would accelerate PV market development by taking advantage of the potential to dramatically lower retail prices to make quality PV systems affordable to many rural Ugandans. Based on experience in other countries, a package of interventions could include: (i) strengthening the local PV capabilities in business, finance and technical areas through direct assistance, supplier support, linkages between the institutional and consumer market segments, and encouraging additional investors and entrepreneurs to enter the sector; (ii) increasing the access of PV businesses to financial institution credits and customer access to end-user microfinance; (iii) increasing consumer awareness and confidence; (iv) increasing access to best price sourcing opportunities, including possibly the local production of some components; (v) establishing a sound market framework in terms of tax and duty treatment and technical standards; (vi) providing a per Wp subsidy to reduce first costs and enable PV to extend sales and service networks, improve product and service quality, and strengthen their financial and business capabilities.

This package of interventions, while lowering retail PV system prices, would increase consumer affordability, acceptance and choice and reduce the technology and market risk perceptions of entrepreneurs for investments in expansions of distribution infrastructure and human resources. The package would be implemented in ways which would reduce the pipeline development and transaction costs and technology and market risk perceptions of interested microfinance and financial sector institutions. The expected result would be competitive, commercial PV sales and service networks extending into rural areas, offering consumers a wide product and price range, with robust product standards and strong after sales and warranty services.

In early years, sales of institutional systems and cash sales of the smaller systems would dominate the market. The demand for larger systems by the more affluent consumers and the smaller systems by the less affluent consumers would grow as: (a) consumer confidence and awareness of the products grows, (b) consumer ability to pay increases due to economic development and evolution of credit markets; and (c) prices come down due to improved sourcing of components and economies of scale in component purchasing and distribution.

An average household which would be a potential solar home system customer spends about \$3.85 per month on kerosene and batteries which could be displaced by solar. This implies a 15 year net present value of costs of about \$320. The 15 year net present value of a 20W solar home system is estimated at \$360 for Phase I, implying an incremental cost of \$40 per system, or \$2 per Wp. It is estimated that about 7,500 SHS systems of sizes ranging from 12 to 100 Wp would be installed in Phase I, for an estimated capacity of about 200,000 Wp, with an estimated incremental cost of \$ 400,000.

In order to provide wider the solar PV market - which would reduce the barriers of limited range of solar pv products - based on the experience with the Bank/GEF supported solar pv projects in Asia, the GEF grant for sales to consumers will be paid according to the following schedule:

- \$2.50/Wp for systems up to 30Wp
- For larger systems, an additional \$1.50/Wp will be paid on the marginal Wp up to a maximum of 50Wp.

For example,

- a 20 Wp system would be eligible for a \$50 grant ( $20\text{Wp} \times \$2.50$ )
- a 40 Wp system would be eligible for a \$90 grant ( $30\text{Wp} \times \$2.50$  plus  $10 \times \$1.50$ )
- a 60Wp system would be eligible for \$105 ( $30\text{Wp} \times \$2.50$  plus  $20\text{Wp} \times 1.50$  plus  $10\text{Wp} \times \$0$ )

In addition, Phase I would support installation of about 800 institutional systems (estimated capacity 400,000 Wp) in health centers schools, and other public applications. In general, such systems will have a lower usage factor, with an estimated incremental cost of about \$ 2.50 per Wp, with an aggregate incremental cost of \$ 1.0 million.

Overall, the total 600,000 Wp for Phase 1 would imply an incremental cost for hardware of \$1.4 million over the base case scenario.

The capacity installed during Phase II would almost double, to about 1 million Wp, and in Phase II would increase still further to about 2.2 million Wp, bringing the total capacity installed by the project to around 4 million Wp. As the market expands, the incremental cost is expected to decline due to increases in market knowledge, broad expansion of sales and service infrastructure, and the wider availability of consumer level financing for solar PV. As a result, the per Wp subsidy would reduce to about \$1.7 in Phase 2, and \$0.5 in Phase 3, as shown in the table below.

### ***Capacity Building***

In the absence of GEF support, some limited capacity building would still be undertaken by Government and the private sector. The cost of this base case capacity building is estimated at \$0.25 million during each of the three Phases.

The GEF Alternative also would include resource assessment and local capacity building to ensure local abilities to identify, design, finance, and implement additional renewable energy investments, to be supported in Phases II and III of the ERT program. Capacity building would be weighted toward the initial Phase of the program, to secure the establishment of core expertise at the local level. In addition, capacity building during Phase 1 would support establishment of the contractual framework and rules/obligations for wheeling power over the main grid for third party sales, related pricing, penalties/remedies for nonperformance, etc. (see section B2, *Government strategy*).

The technical assistance and capacity building would be in line with the principles of the Global Environment facility (GEF)-World Bank Strategic Partnership for Renewable Energy: (i) develop a strategy and implementation plan for building the capacity of in-country intermediaries to identify, develop, appraise and move towards financial closure renewable energy investments, (ii) prepare a renewable energy resource information collection and dissemination system that provides reliable data that enables interested private sector investors to initiate their own assessment of potential projects; and (iii) activities to help



reduce the gap in solar photovoltaic product prices, quality and range by moving Uganda in the direction of international best practices, as applicable to Uganda.

There are two parts to GEF-supported capacity building and technical assistance. First, within the first year of Phase I, the Ministry of Energy will, under GEF-financed TA, develop a renewable energy capacity building strategy and action plan acceptable to the Bank. The implementation of this plan will be undertaken in the latter part of Phase I. Second, the Ministries of Health, Education, and Water are expected to be significant procurers of solar PV equipment in all phases of the ten-year program. Hence, their capacities for this purpose will be enhanced in Phase I. Together, these activities will have an estimated cost of \$ 5.02 million, which yields an incremental cost of \$ 4.77 million. This implies that a relatively large share of GEF funds in Phase I are allocated to capacity building and technical assistance, which is consistent with the overall purpose of the Renewable Energy Strategic Partnership.

### Incremental Cost Matrix

	Baseline	Alternative	Increment
<b>Domestic Benefits</b>	Rural and off-grid market grows, albeit slowly, and primarily with diesel.  Power availability remains constrained, with prices high and reliability low.  Limited development of private power and PV business models or acumen.	Stimulation of business entry into private power service for grid and isolated applications.  Institutional strengthening in development of regulation, pricing, contracts, etc.  Energy costs decline and availability improves, with linkages to productive use applications and development of local small power entrepreneurs.	Barriers (information, first cost, etc.) to commercial development removed.  Successful demonstration of a wide range of alternative technologies and business approaches.  Technology improvement that benefits renewable energy producers and enhances competition with diesel sources.
<b>Global Environmental Benefits</b>	None, rural energy development relies primarily on diesel and unsustainable use of traditional fuels w/ low efficiencies	Significant offset of GHG emissions through range of renewable technology options, displacing 10-30% of what would otherwise be diesel gensets.	830,000 t of carbon avoided  Cost reduction for range of technologies in rural developing country setting and long-term programmatic APL strategy demonstrated.
<b>Cost by Component \$ million</b>			
<b>Phase 1</b>			
C1 – Main Grid			
C2 – Independent Grid	31.55	36.15	4.60
C3 – PV Market Devel.	4.00	5.00	1.00
Capacity Building, TA,	9.30	10.70	1.40
M&E	0.25	5.02	4.77
<b>Subtotal Phase 1</b>	0.00	0.35	0.35
	<b>45.10</b>	<b>57.22</b>	<b>12.12</b>
<b>Phase 2</b>			
C1 – Main Grid			
C2 – Independent Grid	70	74	4.0
C3 – PV Market Devel.	3	5	2.0
Capacity Building, TA,	10	11	1.0
Training, M&E	0.25	2.25	2.0
<b>Subtotal Phase 2</b>	<b>83.25</b>	<b>92.25</b>	<b>9.0</b>
<b>Phase 3<sup>1</sup></b>			
C1 – Main Grid	131	135.9	4.9
C2 – Independent Grid	7	9	2
C3 – PV Market Devel.	35	36	1
Capacity Building, TA,			
Training, M&E	0.25	1.25	1
<b>Subtotal Phase 3</b>	<b>173.25</b>	<b>182.14</b>	<b>8.9</b>
<b>GEF Incremental Costs</b>			30 (APL Total)

Notes:

1 These are indicative estimates. Incremental costs for Phases II & III will be calculated during preparation of these phases and will be subject to GEF Secretariat review and approval.

2 Totals are for renewable energy investments only and do not include other project investments. Therefore, these totals are a subset of total project cost.

Mainstream financing would cover the bulk of the significant investment costs of the project. Indicative financing plan requiring GEF support on a declining basis (as summarized in the indicative financing plan summarized below) with the remainder being provide by IDA funds, other donor investments, and increasingly by the local private investment. This represents a high level of financial leverage on sub-project support.

**Possible Use of Non-Grant Modalities.** Due to a lack of practically implementable alternative modalities in the early stages of the program, the GEF grant for subprojects would be provided directly as a subsidy. As experience grows, in Phases II and III the use of other modalities, such as partial risk guarantees to encourage greater commercial participation will be explored; these would be particularly relevant for renewable energy power generation from sources such as geothermal, wind, and mini-hydro.

<b>PAD Indicative Financing Plan (\$M)</b>							
	<b>IDA</b>	<b>(%)</b>	<b>GEF</b>	<b>(%)</b>	<b>Others</b>	<b>(%)</b>	<b>Total</b>
<b>APL 1</b>	49.15	40%	12.1	10%	61.94	50%	123.2
<b>APL 2</b>	45.00	38%	9.00	8%	66.00	55%	120.00
<b>APL 3</b>	71.00	36%	8.9	4%	116.42	59%	196.00
<b>Total</b>	<b>165.15</b>	<b>38%</b>	<b>30.00*</b>	<b>7%</b>	<b>244.06</b>	<b>56%</b>	<b>439.2</b>

\* of the entire APL, GEF financing comprises approximately 7%

**Declining GEF Grant.** The existing small scale of the market, the relatively low population density, limited ability to pay for energy services, and the relative unfamiliarity with renewable energy technologies among both customers and businesses require a relatively high level of GEF support up-front in order to effect a shift if technology choices and gain critical mass during the first phase and establish the market for a long enough period to facilitate full deployment of installation, operation, and maintenance facilities. For this reason, the GEF grant is “front-end loaded” with a higher absolute amount as well as higher relative cofinancing grants and capacity building costs in the first phase of the program. Both the capacity building requirements, and the cofinancing grants will be required for delivery of an increased number of installations in subsequent phases.

Significant economies of scale are expected to emerge toward the end of the first tranche and will enable some price reductions and decline of the GEF support on a per-installation basis. Initial market areas are generally anticipated to become economically self-sustaining by the end of the second tranche and serve as examples for replication in broader (and more remote) rural market areas. At the end of the project all of the project components are expected to be operating on a commercial basis (reflecting an increase in local project development and implementation capacity, decline in system prices from reduced transaction costs, larger volume, greater experience by entrepreneurs and customers, use of less expensive equipment etc.)

and will be stimulating additional replication of local mini-grid, individual system installations, and entry of additional private power and renewable energy entrepreneurs.

**Domestic Benefits:** It is recognized that the rural electrification services made available as a result of the project include significant domestic benefits (including local economic development, increased availability of household energy, local environmental benefits) – indeed, many of these are direct development objectives under the Rural Transformation approach. Thus, the estimated full incremental costs of completing project components will not be borne by GEF but will also be supported by GOU (IDA) and other donor funds to reflect appropriate costs sharing of the combined global and local benefits. A more detailed analysis of the allocation of global vs. domestic benefits will be performed during project appraisal.

**Global Environmental Benefits.** Based on conservative capacity factors for the sugar mills and other grid-connected renewables, the estimated annual carbon displacement comes to about 450 tons per MW-year. For the 15 MW in Phase I, this comes to 110,000 tons carbon, and for the 70 MW in the full program this comes to 608,000 tons. The lower capacity factor for independent grid systems results in a carbon displacement of 210 tons per MW-year, yielding a displacement of about 2,000 tons in Phase I, and about 50,000 tons over the entire program. Similarly, one watt of solar capacity installed should displace about 8.5 kg of carbon over a 15 year lifetime, resulting in estimated displacement of about 5,000 tons for Phase I, and 35,000 tons for the program overall. This leads to carbon displacement of about 120,000 tons in the first phase, and about 830 thousand tons of carbon over the 15 - 20 year lifetime of the investments - not accounting for any multiplier effects from the development of the various markets and project modalities. This implies a GEF investment of about \$36 per ton carbon.

The calculated value of the cost of carbon of about \$ 36 per ton carbon is based strictly on the supported investments, and does not take account of any multiplier effects or “programmatic effect”. It is reasonable to expect that there will be a programmatic effect not just in Uganda but also in the neighboring countries of Tanzania, Kenya, Sudan and Democratic Republic of Congo, particularly from the solar pv component. The main reason for this widespread effect is that this is the first project in this region which is supporting a systematic, wide-ranging development of a number of renewable energy technologies. Under a reasonable assumption that the multiplier effect will be in the range of 2 or 3, the cost will be in the range of \$ 12-18 per ton carbon.

## **SUSTAINABILITY**

A key long-term objective of the project is to ensure the long-term sustainability of renewable energy investments, particularly after GEF grants would no longer be available. The overall approach is that, over time, sustainability will come from barrier removal, cost reductions, rising incomes, and declining GEF grants.

For renewable energy power generation, the key to sustainability will be barrier removal and declining costs, as familiarity with the technologies and institutional framework increases, and the GEF grant per unit is slated to decline over time.

For solar pv systems, the decline in costs will come from: (i) economies of scale –which are often realized when a credible expectation of a large market has been created, (ii) formation of links to suppliers in Asia, where prices of high-quality systems are much lower than in Africa, and (iii) rising incomes, which will increase the affordability of the systems. Further, the GEF grant per unit for solar pv systems is also slated to decline over time.

Thus, the key assumptions underlying the viability and replication prospects are that cost-reductions will be realized and incomes will rise. Given the GEF share of 20-25% in total costs, it is reasonable to expect that cost reductions and income increases over a number of years will offset the need for such support after the project is over.

Apart from cost reduction, the sustainability of the renewable energy investments will be facilitated by two key factors: (i) the technical assistance and capacity building, and (ii) the opening of carbon-finance investments, which would take advantage of and accelerate the barrier removal and cost reductions brought about by this project.

### **Monitoring and Evaluation, and Dissemination**

Monitoring and evaluation toward the GEF objectives would be coordinated to the maximum extent with the overall APL monitoring and evaluation. GEF-specific indicators, such as market prices and penetration, number of active entrepreneurs, and quantity of installed systems and power generated, are incorporated into the monitoring and evaluation plan. Dissemination of program results will be accomplished through regular reporting as well as contributions to international conferences and other such fora.

The responsibility for this task will lie with the Ministry of Energy. The monitoring and evaluation system will be linked to the M&E of the overall program purpose, to be undertaken by the Ministry of Finance, as well the M&E systems of the end-user Ministries (Health, Education, Water, and Agriculture).

### **GEF STAP REVIEW and RESPONSE**

A review of the Project Concept Document, undertaken by from Dr. Daniel Kammen, of the GEF Scientific and Technical Advisory Panel, is attached. In general, the task team is in agreement with Dr. Kammen's comments, and has incorporated relevant sections into the PCD including the lessons learned and the issue of recycling of lead-acid batteries used in the solar PV systems. The review also describes related experience from Kenya, Nepal, Tanzania, and elsewhere, much of which the task team is familiar with but will investigate further.

The key recommendation of the STAP reviewer is the addition of an international advisory body to ensure that this project continues to benefit from the broadest possible experience base. The team will discuss this concept with the Government, who must ultimately make the final judgement of its merits. Regardless of the Government's decision, the upcoming Energy for Rural Transformation Africa conference, sponsored by the Africa Rural and Renewable Energy Initiative and various other donor agencies and currently scheduled for early 2001, would include a session devoted to review and discussion of the ERT Program. If this proves valuable, such a discussion could be continued in the future in other regional workshops. In addition, the project team recognizes that Dr. Kammen can provide valuable guidance along the lines proposed in his review, and therefore proposes to include Dr. Kammen on the Quality Assurance Team for the program. This addition to the Quality Assurance Team would be subject to any possible reaction from the GEF regarding a potential conflict of interest.

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March 6, 2000

## *Review and Evaluation of*

### **World Bank/Global Environment Uganda Energy for Rural Development (ERT) Project**

#### *Project Summary and Evaluation Overview*

This is an extensive and ambitious project designed to transform the rural energy sector in Uganda with an suite of renewable and fossil-fuel energy systems that could greatly expand the scope and infrastructure for productive rural enterprise and quality of life. This project is also an initial implementation of the Strategic Partnership for Renewable Energy and an important use of the Prototype Carbon Fund. In that role, it is doubly important as a test of the degree to which significant renewable energy-based infrastructure development can be integrated into a larger rural transformation package.

The scale of overall project investment (\$375) and multinational loan and credit support (\$150 million in World Bank/GEF funds; \$30 million of which comes from the GEF), as well as the long project duration (12 years) make this an exceptional commitment to local and regional infrastructure, capacity and opportunity building.

For a project of this magnitude and scope, the project concept document is particularly clear and well designed. There are a number of important areas where added specificity would greatly facilitate project review and oversight, but in several cases this is a function of the project scope and duration (see specific comments on the PCD Annex 3 document, below), and the need to incrementally develop the project

details. That said, the current rapid evolution of technical resources, social and economic options, and interdisciplinary ideas about how to manage rural and energy development suggests that one key addition to the project would be the addition of an international advisory body.

The mission of the international advisory team would be to look at the current project options and future possibilities in as holistic an approach as possible. The composition of this group would need to include project team members and an international and national balance of interested observers. The group would thus include project representatives from the World Bank, the Ugandan Ministry of Energy and Mineral Development, the Ministry of Local Government but critically also members of local municipal councils, non-governmental organizations, and academic and practitioners from Africa and the wider international community. The role of this group would not be to provide project oversight to such an already large project, but instead to act as a board of advisors to examine and consider alternative methods to address rural energy, development, and environmental concerns. These concerns speak directly to Section B3, of the PCD *Strategic choices*. The group could bring aspects of the international experience in these areas into focus and the immediate context of the Ugandan ERT project. The listing of major electrification, renewable energy, and rural transformation projects already in place or also in process provides one logical resource for this input and discourse. One further vehicle might be a regional workshop series to facilitate regional comparisons and information exchange as this process moves forward. I would be personally willing to serve on such a body, or to chair it if needed.

In summary, the overall ERT plan and the GEF Alternative in particular is attractive and given sufficient local direction and opportunity for an evolution of project particulars, should be implemented. The importance and international profile of this project for the early use of the Prototype Carbon Fund, and to future large-scale efforts to promote development based on clean-energy options, strongly suggests that an unusual degree of collaborative input and learning from the experience in this ERT project should be shared and treated as an international resource.

### *General Comments*

The PCD Incremental Cost Annex provides an excellent *general* summary of the issues and issues surrounding the array of barriers to the widespread use of renewable energy. In the context of the Uganda project, however, greater specificity as to how these barriers at the local, and not only institutional or macro-economic level, will be addressed would be particularly valuable. Many of the issues involved in developing a sustainable market for a new technology rest on the specific market opportunities and support mechanisms (training, institutional, material, and financial) available to local entrepreneurs and to end-users. The context of the communities targeted in the APL, the extant local industries, and the local capacity for new commercial activity are all particularly salient to determining how best to support the emerging PV (and other renewable energy) industries. The discussion on page 15 in the ERT PCD speaks to this, but again at a general level.

The lessons learned in the Kenya context (see attached files) provide one, primarily technical, measure of PV market development. Additional perspectives on the most viable local industries to support could be examined and compared through a local community and municipality-based project appraisal process. The PCD cites social capital theory (page 14) as a basis for some of this analysis, which is an excellent start to the process. Analysis based on regional advantage and gender would further complement this theoretical base.

The carbon abatement potential for this project is estimated in the PCD as 600 Mt(CO<sub>2</sub>), or 600

$\text{Mt}(\text{CO}_2) \times (12/44) = 164 \text{ Mt}(\text{C})$ . If, crudely, ascribed to the GEF component, this leads to a carbon abatement cost of under \$0.20/ton (C). This exceptionally low cost is, of course, due to the integration of the project into a larger \$375 million program. While the carbon savings – largely due to forecasts of future low-carbon intensity economic growth – are directly associated with the GEF Alternative, a more sophisticated calculation is in order. In particular, it is important to evaluate the degree to which investment in the broader energy and institutional infrastructure facilitates the development of the GEF Alternative. The reason to undertake this exercise is not academic. Given the likely importance of this project to the evaluation and future planning of the Prototype Carbon Fund as well as future GEF efforts, particular scrutiny of the expected and the realized impacts of this project will greatly facilitate future discussions of the role of renewable energy in national and regional development.

The overall trigger process and project incremental steps are sound as long as the range of input solicited and acknowledged in determining if a specific trigger has truly been met is both diverse and is not dominated by traditional institutional actors. In the renewable energy project plans, for example, this can come either in the form of Ministerial pronouncements, or from a small set of large companies with strong interests in the direction of market evolution. For example, in the context of power sector expected by April 2001 it remains somewhat unclear how the provisions to support small energy generators will be supported. How will ‘non-discriminatory’ wheeling be implemented, enforced, and then evaluated?

An important feature of the project that must be preserved is the slow and steady development, learning, and reflexive analysis that the new social, institutional, and educational components require. Overly rapid growth in funding can do as much to harm a fledgling institution as can neglect. Mechanisms are also required to integrate and to recognize the pervasive nature of the informal rural economy, and the degree to which interventions have implications – sometimes delayed – across society. In a project of this scale there has been a tendency in the past to accelerate the process based on signs of technical progress that in fact disguises or ignores needed social support and adaptation time.

### *Specific Comments and Recommendations:*

- Annex 3, Project Concept Document, page 1 ff:  
Examples from Annex 3 include the individual plans and interactions between the ERT sub-project Components 1 and 2 (Main Grid vs. Independent Grid Systems). In this case physical separation of the main and mini-grids does not mean that they will not impact each other, and where the details of the wheeling model could dramatically impact the economics and effectiveness of mini-grids. Second, Component 4 appears to provide a largely open-ended opportunity to target and develop attractive technologies and rural energy concerns (such as fuelwood, potentially also the charcoal trade, and presumably other approaches to rural energy services such as solar thermal systems). The approach taken to the biomass sector could have dramatic impacts on household energy use, public health (Kammen, 1995; Ezzi, Mbinda, and Kamen, 2000), and rural industries (e.g. formal and informal charcoal markets, and distilleries) and gender. In each case, a clear project development plan to consider how the promotion of rural mini-grids impacts the development of a rural PV industry, or how a woodfuel policy impacts the economic opportunity along gender lines is important and should be considered in the broader policy picture of the ERT program.
- PCD, Page 3 and Annex 3, PCD, page 2 ff:  
Lessons for the solar photovoltaic industry in Uganda from Kenya:

The growth of the photovoltaic solar home system market in Kenya has been both dramatic, and provides a



number of important ongoing lessons for the ERT in Uganda. Copies of a recent report on this topic (that will soon be published by ESMAF) are attached as three files (text, figures, and tables). In brief, Kenya has an active solar home systems (SHSs) market, with cumulative sales in excess of 100,000 units and current sales of about 20,000 systems per year—all without any substantial subsidy and with only minimal programmatic support. There are more than 40 independent manufacturers, vendors, installers, and after-sales providers to serve this demand.

When the SHSs market emerged in the mid-1980s, typical systems used crystalline (x-Si) modules of 40 Wp (Acker and Kammen, 1996). In 1989, however, 10 Wp amorphous silicon (a-Si) modules entered the market, capturing the majority of SHSs sales within five years (Hankins, *et al.*, 1997). Since then, total a-Si sales in Kenya have increased dramatically, from 10 kWp in 1989 to 270 kWp in 1998.

Essentially all a-Si modules sold in Kenya go into SHSs, and a substantial majority of all SHSs use a-Si modules—though most a-Si SHSs in Kenya hardly qualify as systems at all. In one typical pattern, families simply tie a module to their roof and directly wire it to a car battery that they already own and charge in town. Among other system design issues, the lack of a charge controller raises concerns about battery longevity; however, the critical advantage of this approach is that it reduces the incremental cost of “going solar” to as little as US\$70. This has made PV accessible on a fully commercial basis to thousands of Kenyan households that otherwise would not have been able to afford it. At the same time, important issues about consumer education, resources available to large and (in particular) small-scale commercial enterprises, and training opportunities all exist. Each of these issues could impact the future sustainability of the industry, and provides important ongoing lessons for the Ugandan experience. Examination of the Kenyan experience (as well as that from other nations) could provide important insight into the market (and, critically, the non-market) barriers to renewable energy development as specified in the PCD Cost Annex (page 3 - 5). Instead of detailing those again here, I will refer to the (attached) documents. However, I would be willing to provide further discussion of this point if needed.

- PCD Incremental Cost Annex, page 4, the ***Rural Electrification Fund***.

The specific plan and parameters of the Rural Electrification Fund are not specified, either in terms of its role in market transformation (Duke and Kammen, 1999), or in terms of its role in promoting social equity and other goals. This could be developed over time, notably in consultation with the proposed international advisory body, but at this stage is not yet sufficiently specified.

- Significant experience with local mini-grids, both in terms of technical implementation, management, and collective management, exists in a number of areas Nepal (Inversin, 1996a, 1996b) and Tanzania Professor Bjorn Kjellstrom has for several years directed a project to implement and study rural electricity cooperatives in rural Tanzania. These efforts, supported by the Swedish International Development Agency, provide a wealth of positive and negative lessons that would be useful to examine in planning the current project. Both have important projects in place that might be visited, or reviewed, for the planning phase of the Uganda project.

- As noted in the PCD (Page 26), the ongoing UNDP-GEF Uganda Pilot Project for Photovoltaic Rural Electrification provides only a limited model and experience from which to grow the program components in the full ERT. Broader experience from other projects is crucial here (Hankins and van der Plan, 1998).

- Section E: Issues Requiring Special Attention (page 26- 30).  
Several concerns exist here.

In Section E.6, Environment:

- Management, recycling, disposal, and of batteries for PV systems requires attention, particularly if the industry is to grow as fast as expected (from annual sales of roughly 500 – 1,000 systems/year to over 10,000/year). Regional recycling, education, and buy-back plans are all options here.
- Biomass energy management, while primarily an important environmental gain, has a number of associated concerns that are not currently discussed in detail, but which should be noted and addressed. In particular, the development of regional and local biomass markets can develop beyond the biofuels provided by the local mills and sugar facilities. It is important to consider the potential for poor families to make food vs. fuel (and thus cash) tradeoffs that adversely impact their health.

Impacts of women of changes in the rural, informal, economy that can result from the ERT are not listed.

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- Encl: (1) aSi\_ESMAP\_Report-3-6-00.doc  
(2) aSi\_ESMAP\_Tables-3-6-00.doc  
(3) aSi\_ESMAP\_Figures-3-6-00.doc

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**Additional  
Annex 12**

**Letter of Sector Development Policy**

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In any correspondence on  
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April 4, 2001

Mr. James W. Adams  
Country Director, Uganda  
World Bank  
1818H Street, NW  
Washington, D.C. 20433  
USA

Dear Mr. Adams,

**LETTER OF SECTOR POLICY IN RESPECT OF UGANDA'S RURAL ELECTRIFICATION  
STRATEGY AND PLAN**

**1.0 Background**

This letter of Sector Policy highlights the framework for rural electrification in Uganda. The framework is articulated in the Rural Electrification Strategy and Plan document covering the period 2001 to 2010. The Strategy and Plan is consistent with the overall Government objectives for rural transformation and poverty eradication through modernisation of agriculture, creation of opportunities for employment and the provision of basic social services. It is also consistent with the Power Sector Strategic Plan which emphasises increasing area coverage for electricity supply and innovations in rural electrification approaches.

**1.1 Objectives of the Rural Electrification Strategy**

The Electricity Act 1999, Section 63, obligates the Minister responsible for energy to prepare a Rural Electrification Strategy whose main objectives states as follows:

The Government shall undertake to promote, support and provide rural electrification programmes through public and private sector participation in order to:

- a) achieve equitable regional distribution of access to electricity;
- b) maximise the economic, social and environmental benefits of rural electrification;

- c) promote expansion of the grid and development of off-grid electrification; and
- d) stimulate innovations within suppliers.

## **2.0 Major Elements of the New Rural Electrification Approach**

2.1 Paradigm Shift: There will be a paradigm shift in policy from grid extension by the public sector to emphasize private sector decentralised electrification, focusing progressively on demand driven projects.

2.2 Overcoming barriers to decentralised electrification:

In order that the new approach works well the programme will address the following identified barriers;

- i) the traditional belief that Government has the responsibility to provide electricity; consumer awareness about the new shift must be heightened;
- ii) the low technical and managerial capacity for designing and implementing rural electrification projects among local institutions and project sponsors;
- iii) weakness in the local financial sector;
- iv) high up front investment in grid extension; and
- v) taxation issues connected with generation using fossil fuels.

### **2.3 Establishment of the Rural Electrification Fund (REF)**

The REF will be established to provide investment subsidies/grants.

2.4 Subsidies for Rural Electrification: The programme will promote the use of "smart subsidies" for leveraging capital investment costs.

2.5 Tariff Policy: In order to make projects commercially viable, the tariff revenue must cover the costs to the service provider, allowing a return on equity and commercial investment. The strategy, therefore, promotes the principles of differential tariffs.

2.6 Cross-Sectoral Linkages: The Strategy is not to provide energy per se but to target both production and social sectors that are critical for rural transformation. Projects will target programmes in agriculture, communication, health services, education, water and transport.

2.7 Rural Electrification Master Plan: A Rural Electrification Master Plan will be prepared to provide information on investment opportunities and potential demand. The plan will be updated every fifth year.

## **3.0 Institutional framework**

An appropriate institutional framework has been designed to facilitate the implementing of the Strategy and Plan. This includes the following:

3.1 Rural Electrification Agency: The Rural Electrification Agency (REA) will provide the technical back up, including the evaluation of projects, preparing and updating the Master Plan; initiating feasibility studies, establishment and keeping of a data base, publicity, reporting and advice on regulatory issues.

3.2 Rural Electrification Board: There will be a Rural Electrification Board (REB) that will be responsible for policy on subsidies, approving projects, and overseeing of the management of the Rural Electrification Fund (REF).

3.3 Trust Agent: A Trust Agent will be appointed to administer payments of funds from the REF to project sponsors.

3.4 Financial Institutions: Local financial institutions will serve as the financial intermediaries through which project sponsors will access commercial financing.

3.5 Electricity Regulatory Authority (ERA): While the ERA will be responsible for regulating the rural electrification projects as provided for in the Electricity Act, 1999, it will delegate its authority to appropriate local entities, including local authorities, to provide light regulation for projects of less than 2 MW generation capacity or electricity sales of less than 4 Gwh.

#### **4.0 Electrification Targets and Funding Requirements**

4.1 Access: At a minimum, the Strategy aims to reach a rural electrification rate of 10% by the year 2010.

4.2 Funding: The REF is to be composed of approximately US\$ 125 million of grant funds over the 10-year period. A total investment of at least US\$ 375 million will be required.

#### **5.0 Concluding Remarks**

The above account provides a summary of the major elements of the Rural Electrification Strategy and Plan, which forms the basis for implementing the Energy for Rural Transformation (ERT) Programme. This Strategy and Plan is already approved by Cabinet and is ready for implementation. The detailed document is herewith attached.

Yours Sincerely,



Gerald M. Ssendaula

MINISTER OF FINANCE, PLANNING & ECONOMIC DEVELOPMENT

# **Rural Electrification Strategy and Plan**

**Covering the Period 2001 to 2010**

**Ministry of Energy and Mineral Development**

Draft - February 2001

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## List of Abbreviations

ERA	Electricity Regulatory Authority
GWh	Gigawatt hours
HV	High Voltage
kWh	Kilowatt hours
LA	Local authority
MEMD	Ministry of Energy and Mineral Development
MFPEd	Ministry of Finance, Planning and EconomicDevelopment
MW	Megawatts
NEMA	National Environmental Management Authority
NGO	Non-governmental organisation
NURP	Northern Uganda Reconstruction Programme
PC	Personal Computer
PSRPS	Power Sector Restructuring and Privatisation Strategy
PV	Photovoltaic (solar power technology)
RE	Rural Electrification
REA	Rural Electrification Agency
REF	Rural Electrification Fund
TA	Technical Assistance
UEB	Uganda Electricity Board



# Executive Summary

**The Electricity Act, 1999**, provides that the Minister responsible for electricity shall prepare a sustainable and co-ordinated Rural Electrification Strategy and Plan for Uganda for the approval of Cabinet, and once in each year to submit to Parliament a report on progress and achievement of the Plan. The present document constitutes the first Rural Electrification Strategy and Plan covering the period 2001 to 2010 and prepared by the Ministry of Energy and Mineral Development in consultation with the Ministry of Finance, Planning and Economic Development, the Ministry of Local Government and other stakeholders in the private and public sector.

**Rural electrification forms an integral part of the Government's wider rural transformation and poverty eradication agenda.** The Government's Poverty Eradication Action Plan (1998-2000) has the aim to raise incomes of the poor through provision of infrastructure, credit, etc., and to improve quality of life. Increased electricity access facilitates greater income generating opportunities and allows the provision of better public services, especially healthcare. But, it is only one condition for rural development. Other Government programmes on infrastructure such as transport and communication means, water and programmes on health services and education are equally important for rural transformation. The RE strategy seeks to maximise the economic, social and environmental benefits of rural electrification subsidies through a close co-ordination of the electrification programme with other Government activities in the rural areas. Special instruments, procedures and sub-programmes will be developed for making cross-sector co-ordination an integral part of rural electrification projects.

**The primary objective of the RE Strategy is to reduce inequalities in access to electricity and the associated opportunities for increased social welfare, education, health and income generating opportunities.** Electricity is currently available to about 2% of rural households: UEB has 170,000 customers, of which 80,000 live outside the urban Kampala-Jinja-Entebbe triangle. UEB has been adding new connections at a rate of roughly 8,500 a year mainly in urban and peri-urban areas, whilst the number of households is growing at 100,000 every year, more than half of which are in rural areas. This illustrates the scale of the electrification challenge and the need for a fundamental change of policy and approach.

**The Government's Rural Electrification (RE) Strategy aims to achieve for the year 2010 a rural electrification rate of 10%, meaning that 480,000 rural consumers, a net increase of 400,000 over the year 2000 figure are to be serviced.** It is estimated that 15% of the increase in serviced households will come from higher connections to the existing grid outside the urban triangle, 40% from extension of the interconnected grid, 25% from isolated grids and 20% from photovoltaic solar systems.

**The rural electricity coverage rate, - the percentage of rural households living in the service areas of low voltage distribution grids – to be achieved in the year 2010 is 30%.** More than 1.2 million rural households will be living in electrified areas.

**Under the Government's new policy approach development is demand-driven.** Any capable sponsor: private companies, NGOs, local authorities and communities will all be able to initiate electrification projects. The fundamental element of the new approach is that it will be progressively demand-driven; Government will determine policy, promote investments, set targets and provide guidance to investors. For areas which are not yet attractive for the private sector, Government will promote public-private

partnership to electrify them in a realistic time.

**A Rural Electrification Master Plan** will be prepared by the RE Agency in co-operation with the system operator. It will provide information on investment opportunities and potential demand. The plan will be updated every fifth year. Priority regional distribution projects identified in the plan may be subject to feasibility studies financed by the RE Agency leading to tendering and bidding for their licenses. When the first indicative plan has been prepared, the present Rural Electrification Strategy and Plan will be updated with specific details.

**The de-monopolisation of the power sector leads to the replacement of the current system of standard national tariffs with tariffs reflecting the investor's cost of supply.** Since decentralised initiatives have to be commercially viable, tariff revenue must cover the costs to the service provider, allowing private capital to make a return and finance the investment. As a result, consumers in different parts of the country will pay different tariffs. . Providing rural investors and consumers with equal terms, the principle of cost-reflective tariffs will be applied also in the case of a private investor taking over all of UEB's distribution systems that are connected to the national grid as one distribution and supply license. This principle implies that new connections outside the post UEB concession would face tariffs likely to be different from the initial concession area.

**The Rural Electrification Fund that will be established in accordance with the Electricity Act is the instrument for achieving equitable regional distribution access to electricity.** The rural economy is the backbone of the national economy in terms of employment, value added and foreign exchange earnings. It will grow if the rural infrastructure, of which reliable and affordable electricity supply is an indispensable part, continues to be improved. The development of this infrastructure faces important economic barriers. The up-front investment in grid extension projects is huge, whereas initial demand is relatively low; and the cost of diesel operation is inflated by the high tax of diesel fuel and company margins. In order to make rural electrification projects commercially viable and tariffs affordable for an important number of rural communities, the Fund will utilise subsidies to buy down investment costs, risks and information barriers to public or private initiatives. The objective of the Fund will be to get maximum access per invested subsidy amount subject to the satisfaction of regional equity requirements. Investments by the post-UEB concession holder in his rural electrification areas will qualify for support from the Fund on equal footing with project proposals from other sponsors.

**Funding for the REF** shall, as stated in the Electricity Act, come from money appropriated by Parliament, any surplus made from the operations of the Electricity Regulatory Authority, a levy on transmission bulk purchases of electricity from generation stations to be determined by the Minister with the approval of Cabinet, and from loans and grants. To achieve the target of connecting 400,000 households by 2010, the Government estimates that a total investment of US\$375 million and REF funding of US\$ 125m will be required over a ten year period. The levy on transmission bulk purchases of electricity is the only remaining cross-subsidy from grid connected to non-grid connected consumers; it will be set at the level of 5%. Especially during the initial years, the major share of funding will have to come from donors if credible expansion results are to be achieved.

**Institutional details of the Fund.** A Board composed of Permanent Secretaries of the Ministries of Energy and Mineral Development, Finance, Planning and Economic Development, Local Government, a representative of the donors, a representative of the private sector, a representative of civil society, a representative of the banking sector and a professional with expertise in regulatory matters will oversee the management of the Fund. Grant applications will be assessed by the Rural Electrification Agency against objective eligibility criteria and then passed on to the Board for approval. A Trust Agent will then handle

the disbursement of funds to the applicants.

**Small-scale power generation**, especially utilising clean and indigenous renewable energy sources, can play a key role in supporting expansion of electrification in Uganda. To facilitate commercially based development of such systems, a standardised transactional framework will be implemented including power contracts, pricing terms and regulation. The target is to have at least 70 MW of renewable energy capacity other than large-scale hydropower developed by the year 2010. The Government will make maximum use of the opportunity for attracting grant support from financing tools related to the Kyoto-Protocol.

**Solar PV systems** are the least cost technology for providing electricity to small, scattered communities. The strategy of the Government is to assist the development of a national solar PV market. -Subsidies will be given for institutional systems (e.g. water pumping, health, education) to strengthen the quality of local social services; and for solar home PV systems market development.

**Financing, constructing and managing an electricity service requires technical knowledge, an appropriate credit scheme and business skills that rural communities and potential private operators lack.** In order to overcome these barriers and stimulate more electrification projects, the RE Strategy includes a strong and long-term capacity building and intensive awareness raising and promotion.

**The regulation of RE projects** will be the responsibility of the Electricity Regulatory Authority (ERA). Regulation of small grids will be “light-handed” to avoid the regulatory process to become an administrative barrier for private sector involvement. The RE Strategy requires the ERA to develop specific rules for the RE projects including: relaxed licensing requirements, tariff levels, appropriate safety and service level standards and regulations for facilitating grid extensions. Regulatory responsibilities for small electricity systems may be delegated to local authorities, where sufficient capability exists at this level, in accordance with the Electricity Act.

**Links with power sector strategy.** The RE Strategy builds on and extends the thinking on rural electrification set out in the Power Sector Restructuring and Privatisation Strategy (PSRPS) of June 1999. It provides the rural complement to the privatisation of UEB, which, otherwise, would have benefited mainly urban consumers.

# 1. Introduction

In June 1999, the Government of Uganda set out a new policy framework for the electricity sector in the Power Sector Restructuring and Privatisation Strategy (PSRPS). The new policy emphasises the role of private participation as a key driver of greater efficiency and improved performance in the power sector. The policy seeks to promote competition where possible in order to provide maximum efficiency incentives and options for consumers.

The centrepiece of the new policy is the ending of the Uganda Electricity Board's (UEB) monopoly on the generation, distribution and supply of electricity in Uganda. The enabling legislation for this new policy, the Electricity Act, was approved by Parliament in October 1999.

Increased access to electricity in rural areas is one of the key objectives of the Government's new policy, Part VII of the Electricity Act establishes the legal framework for achieving the Government's objectives for Rural Electrification (RE) including the establishment of a Rural Electrification Fund to provide subsidies for rural electrification and a national rural electrification data base. Section 64(i) states that:

*The Minister shall prepare a sustainable and co-ordinated Rural Electrification Strategy and Plan for Uganda for the approval of Cabinet.*

Further, the Minister shall once a year submit to Parliament an annual report on the progress and achievement of the Plan; periodically evaluate the impact of the rural electrification programme; and the Minister may, from time to time, with the approval of the Cabinet, amend the Rural Electrification Strategy and Plan.

This document provides Uganda's first Rural Electrification Strategy and Plan covering the period 2001 to 2010 for presentation to the Cabinet. The RE Strategy It has been prepared by the Ministry of Energy and Mineral Development in consultation with the Ministry of Finance, Planning and Economic Development, the Ministry of Local Government and other stakeholders in both the public and private sectors.

## 2. Background and Objectives

### 2.1 Background

**Rural electrification forms an integrated part of the Government's wider rural transformation and poverty eradication agenda.** Uganda's aspiration as expressed in the Government's Poverty Eradication Action Plan (1998-2000) is to make farm and off-farm led economic growth a key pillar of broad-based growth. Sustainable rural development with increase in rural incomes and quality of life hinges critically upon: (i) enabling small and medium rural enterprises as engines of economic growth; and (ii) provision of basic social services to meet community needs such as health, education, water, telecommunication services and lighting.

The lack of adequate investment for the provision of a synergistic package of infrastructure activities, of which electricity is a key component, is seriously undermining the growth potential of small and medium enterprises – a major element of rural transformation. The lack of electrification forces consumers to use

sources of power that are of inferior quality and are very expensive on a per kWh basis.

A successful RE programme will accelerate the progress of many of the Government's other priority policies. The RE program, for example, will support agricultural processing in rural areas, a key objective of the Program for Modernization of Agriculture. The provision of affordable and reliable electricity will transform the provision of rural healthcare by providing refrigeration for vaccines and enabling improved standards for operations. It can improve education objectives by extending classes into the nighttime and by allowing modern teaching equipment, such as PCs to be introduced. It can improve water supply services and save time for women.

Roughly 5% of Ugandan households have access to electricity. In rural areas, the figure is about 2%, of which less than half is provided by UEB, the remainder coming from household generators, car batteries or solar photovoltaic (PV) units. About 4 million households in Uganda do not have access to electricity; the overwhelming majority of these, about 3.7 million, live in rural areas.

UEB has 170,000 customers, of which 80,000 live outside the urban Kampala-Jinja-Entebbe triangle. UEB has been adding new connections at a rate of roughly 8,500 a year mainly in urban and peri-urban areas; whilst the number of Ugandan households is growing at 100,000 every year, more than half of which are in rural areas.

This illustrates the scale of the Uganda's electrification needs and the limited scale of the progress made to date. The requirement for a fundamental change of policy and approach is clear, and the Electricity Act, 1999 provides the opportunity for achieving this change.

## 2.2 Objectives

The **objectives** of the Government's RE Strategy are set out in Section 63 of the Act:

The Government shall undertake to promote, support and provide rural electrification programmes through public and private sector participation in order to:

- (a) achieve equitable regional distribution access to electricity;
- (b) maximise the economic, social and environmental benefits of rural electrification subsidies;
- (c) promote expansion of the grid and development of off-grid electrification; and
- (d) stimulate innovations within suppliers.

The **primary objective of the RE Strategy** is to reduce inequalities in national access to electricity and the associated opportunities for increased social welfare, education, health and income generating opportunities. The target is to reach a rural electrification rate of 10% that means an 400,000 rural households are to be serviced by 2010.

**The promotion of renewable energy** is another important element of the Government's RE Strategy. At present, apart from the large hydropower plants, only a tiny fraction of Uganda's renewable energy potential - consisting of biomass, small hydro, solar, wind and geothermal resources - is being exploited, largely for self-generation by sugar and coffee producers. Renewable energy can provide a cost-effective method of electrification, especially in the many rural areas that are remote from the grid. In the past, key policy and other barriers have held back the potential of these indigenous and environmentally friendly energy resources. The new RE Strategy aims to facilitate a rapid rise in the use of renewable energy by

removing or reducing existing barriers to market penetration.

This policy contributes to the achievement of the international goals for the containment of greenhouse gases fixed in the Kyoto-Protocol. Maximum use will be made of the potential for attracting grant support from financing tools related to the Kyoto-Protocol.

### **3. New Paradigm for Rural Electrification**

#### **3.1 Shift to Decentralised Decision Taking and Responsibility**

The scale and diversity of Uganda's electrification requirements, and the slow progress of the traditional approach based on investment by UEB, demonstrate the need for a paradigm shift in policy, in order to provide an effective electrification programme. The fundamental elements of the new paradigm are that progressively it will be demand-driven, and based on decentralised private initiatives, whereby private companies, NGOs, local authorities and communities will establish and manage their own electricity supply arrangements. For areas, which are not attractive to the private sector, Government will promote public-private partnership to electrify them in a realistic time.

#### **3.2 Type of Projects**

The expected RE project types can be grouped into three categories: grid extensions, mini-grids and PV systems. The main features of each are set out below.

**Grid extension** - Extending the transmission grid to cover a new community is the least cost solution when the volume and value of demand justify the cost of the new lines through savings on diesel operation. New concessions are being created out of the existing UEB distribution areas and they will be operated by private investors. These concessionaires may have universal service obligations within their licence areas, leading to 'intensification' of the existing grid. These concessionaires will be able to undertake electrification projects outside of their licence areas and may become the most active sponsors in the RE programme. However, grid extensions could be undertaken by other parties, subject to meeting published standards for the connection to the existing grid.

**Mini-grids** – If demand is not large and the distance to the grid is great, a mini-grid may be more cost effective. The mini-grid may be based on the expansion of agro-industrial generating capacity currently used for self-generation, or on diesel or renewable energy capacity. Such grids are particularly well adapted to relatively concentrated areas with a potential for productive uses like trading centres and other clusters of businesses and homes.

**PV** – PV technology is appropriate for isolated and dispersed electricity requirements. The major disadvantage of PV systems is their limited capacity – they are only competitively able to satisfy household and small commercial requirements (lights, TV, radio, etc). Thus, PV systems do not offer the same scope for rural income generation available from grid-based systems. However, PV may be the only option for isolated social centres (schools, clinics, etc) and for communities that are far from the grid and do not have reliable hydro or biomass supplies.

### 3.3 Barriers to Decentralised Electrification

For the demand- driven approach to be effective, a number of barriers need to be overcome and the drivers of private participation need to be established and enhanced.

**Project sponsoring.** A first important barrier to overcome is the weak capacity for project sponsoring. Due to UEB's past monopoly on electricity supply, decentralised initiation of projects to electrify local communities is a new activity. Rural enterprises and institutions, such as hospitals, have invested in decentralised electricity generation for their own consumption; their investments have not been part of a broader effort to provide electrification to the local community. There is potential to convert the existing and any potential decentralised generation capacity to public use.

**Consumer awareness.** Although being unserved, the rural population has been exposed to the idea that the provision of adequate infrastructure, including electricity was the responsibility of the government and would be provided through government entities such as the UEB. Political promises of rural electrification may not have been fulfilled, yet, the memory of such promises is still vivid. Shifting the initiative to local project sponsors requires some adjustment in thinking. The high and locally differentiated tariffs are another novelty to get used to and gain acceptance. These issues call for intensive consumer awareness.

**Technical capacity.** The country has a scarcity of experienced qualified staff. The number of firms in rural electrification in Uganda must be increased in order to avoid monopolistic pricing and deteriorating quality.

**Financing.** The local financial sector is weak overall, and the banks and other financial intermediaries have no experience with project financing in rural electrification. Previous financing for electrification has been for diesel generators installed by private rural enterprises. The pay-back period on these investments corresponded to the two to three years maturity of the loans. To finance grid electrification projects with long pay-back periods, where revenue depends on uncertain demand forecasts about the ability of consumers to consume electricity in sufficient quantities and at cost-coverage prices will be considered as a high risk lending activity. Once confidence has been gained over the years from the successful implementation of rural electrification projects, this barrier will be reduced. Initially, there may be need to facilitate financing to project sponsors.

**Economic.** The upfront investment in grid extension projects is huge resulting in long pay-back periods for the investment. Initial demand, when loans have to be repaid, is relatively low. Compared with urban electrification, the cost of investment per volume of kWh sales is much higher, whereas ability to pay high tariffs is, on average, lower and subject to seasonal fluctuation caused by the harvest pattern. Investors would not have sufficient equity, if the project were to be fully commercially financed with a lender imposed requirement of say, 25% of investor equity. Even if sufficient equity were available in principle, the risk-adjusted rate of return on equity required to attract investors would put the cost of electricity outside the range of very few rural people.

**Taxation.** The cost of diesel operation in isolated grid projects is inflated by the high taxes on diesel fuel, an indirect tax on transport, theoretically destined to cover the cost of constructing and maintaining the national road infrastructure. Consumers connected to the integrated grid supplied by hydropower are not subject to this taxation. Yet, eliminating the tax on diesel fuel for power generation would be difficult due to the risk of diversion of fuel for transport purposes. **High Initial Unit Costs.** Grid based electricity is an investment in infrastructure with high upfront costs. Extending the transmission grid to one locality, facilitates the subsequent extension of the transmission line to the next locality. The initial cost per

connected customer in a distribution grid is high, the marginal cost of subsequent intensification of adding more customers to the existing grid is lower. Yet, revenue from the initial consumers must from the start cover the full cost of operation and maintenance, repayments on loans and at least some return on equity. This results in high tariffs. The situation for the build-up of an adequate marketing and after-sales PV-systems is somewhat similar. The low volume of sales is inadequate for a marketing and after-sales service network. The low initial sales volume makes investments in a dealer network very costly per sold system.

### 3.4 Justification for Subsidies to Rural Electrification

**Market failure.** The barriers described above represent a classical example of market failure: that a high value good is being under-supplied. The market failure in rural electrification in Uganda revealed by the above listed barriers has two components: one is the absence of an appropriate institutional framework for supporting rural electrification, the other is the inability to capture the value of positive development externalities in the setting of tariffs.

**Social and regional equity.** The existence of market failure is one justification for supporting rural electrification with subsidies, the other is social equity. Without subsidisation, there will be little community electrification. Although only a minority of households in the grid distribution area will benefit from direct access to electricity for many years, all households in the area benefit from the indirect access through public lighting, and the facilitation of better education, health, water and telecom services.

**Subsidy targets.** Subsidies to rural electrification projects are required in the form of:

- (direct) subsidies to reduce the up-front costs and increase affordability ; and
- (indirect) subsidies through the financing of awareness and capacity building for the development of the supporting business infrastructure.

### 3.5 New Policy Instruments

#### 3.5.1 Rural Electrification Master Plan

The Electricity Act 1999 obligates the Government to undertake to promote, support and provide rural electrification programmes through public and private sector participation. In order that the Government undertakes this obligation in a coordinated manner, with a clear idea on future options available for accessing electricity services to different areas/communities, the Government must develop a Rural Electrification Master Plan.

The main objective of the Rural Electrification Master Plan will be to provide guidelines and establish priorities for public and private investments in rural electrification in order to meet development needs in a coordinated and cost effective manner while, at the same time, addressing the issues pertaining to imbalances in regional distribution access of electricity.

Specifically, the master plan will aim at helping the planners to:

- understand the demand for electricity in rural areas;



- identify grid and off-grid areas;
- prioritise potential projects;
- provide indicative costs of potential projects;
- carry out grid network analysis for rural electrification;
- identify projects for implementation by the private sector or public or public/private sector partnership; and
- make the population understand the viable options for providing them with electricity.

The Rural Electrification Master Plan will be prepared by the Rural Electrification Agency in co-operation with the System Operator, covering a 20-year period. The master plan will be reviewed and up-dated every five years to accommodate changing circumstances.

The Master Plan will have the following major elements:

- A projection for electrifying all grid connectable areas. Iso-costlines will be determined for connecting communities and the phasing of the connections carried out starting with the least cost one. However, the post-UEB concession operator or any other investor may choose to do a project out of sequence depending on certain expedient factors.
- A map of communities/areas that can only be cost-effectively supplied by mini-grids, specifying the potential sources of supply. For these communities, approximate projections will be provided for grid connection, wherever possible, so that informed investment decisions are made.
- An inventory/map of communities or settlements that can neither be accessed by the grid nor electrified using mini-grids. These communities or settlements will be candidates for PV electrification.
- Investment requirements for each of the modes above will be estimated.

The Master Plan will be developed through a comprehensive study to be executed in the very beginning of the Government's rural electrification programme. In order to facilitate this study, the Rural Electrification Agency will use the district administration to help identify potential projects. The projects so identified-will be placed on a national and regional maps using a GIS tool.

Priority projects identified in the plan will be subject to feasibility studies financed by the Rural Electrification Agency, unless initial development of the project has started already at the local level. The license for the regional projects supported by feasibility studies will be offered to the private sector by public tender. Investments in these projects will be subject to the general rules for the allocation of subsidies from the Rural Electrification Fund.

The master planning process will start in early 2001 and will be phased as follows:

- i) Project inception and planning

- ii) Data collection
- iii) Costing of electricity access to identified settlements using various scenarios
- iv) Identification of grid and non-grid areas
- v) Network planning (grid and off-grid)
- vi) Financial and economic analysis
- vii) Prioritisation of electrification projects
- viii) Production of Rural Electrification Master Plan.

### 3.5.2 Tariff Policy

In order to stimulate decentralised initiatives, projects must be commercially viable. Tariff revenue must cover the costs to the service provider, allowing private capital to make a return on equity and finance the investment. This implies that consumers in different parts of the country will pay different tariffs. . The principle of local cost-reflective tariffs will be applied also to the new distribution and supply licenses that are created out of UEB's distribution areas:

- New connections outside the main grid concession, including those undertaken by the main grid concession operator would face tariffs likely to be different from the initial concession area.
- Since the isolated grids held by successor-UEB have similar cost structures, these grids will be regulated as a single tariff zone as long as they are not privatised as individual license area. Due to the high differences in costs, the tariffs charged to rural consumers will be much higher than tariffs on existing grid, often by a multiple.

### 3.5.3 Investment Subsidies

**Grid based systems.** Very few, if any, countries in the world have been able to carry out rural electrification without subsidy support; given issues of market failure, social and regional equity. Under UEB's monopoly based system of nation-wide tariffs, the losses on investments in rural electrification were compensated by surplus profits from urban revenues. The Government will continue to subsidise investments in new rural connections using grants from the Rural Electrification Fund (REF), see section 4.4., The Fund will use subsidies to buy down pre-investment costs, risks and information barriers to public or private initiatives, thereby making rural electrification projects commercially viable and tariffs affordable for an important number of rural communities. Investments by the post-UEB concession holder in his rural tariff zones will qualify for support from the Fund on equal footing with project proposals from other sponsors.

**For solar PV-systems,** the strategy of the Government is to assist the development of the solar PV market to a scale that permits marketing and after-sales service network to be established throughout Uganda. High subsidies from the REF will be given to the *institutional systems* (water supply, health, education) to strengthen the quality of local social services; the *solar home PV systems* market will receive grant support

during the initial market build-up phase.

### **3.5.4 Capacity and Awareness Building**

The Government recognises that community level sponsors are likely to have significant capacity building needs in terms of awareness, technical knowledge and business skills. The National Awareness Campaign and the Capacity Building Programme are to provide these (see section 4.4).

### **3.5.5 Regional Equity**

The Act specifies that the Government's RE programme should "*achieve equitable regional distribution access to electricity*".

The Government will monitor the evolution in the regional distribution of projects. The provision of sustainable electricity supply to a maximum of new consumers will be the major determinant for fixing the criteria for the award of subsidies to individual projects. Yet, the criteria must take regional equity considerations into account. Strict application of the maximum access principle would favour the electrification of major rural population centres located close to the national grid, that have attractive productive loads. Whilst such a subsidy policy would have the greater impact on economic growth, it would lead to political tensions if the poorer regions in Uganda were de facto excluded from the national electrification program for a longer time period.

The Government will use policy instruments for promoting a regionally balanced electrification development that are transparent and avoid imposing undue economic and financial costs on the national economy:

- Bonus subsidy rates will be defined for poor and under-served areas that qualify according to a published set of objective criteria, such as: the rate of electrification in major population centres, and national census data on average regional income and prevalence of poverty;
- Especially intensive awareness raising and capacity building will be carried out in under-served regions; and
- Subsidised PV-based community packages for schools, clinics, public lighting, water supply, etc. will be offered to communities that are expected to remain off-grid for many years.

### **3.5.6 Promotion of Cross-sectoral Linkages**

The Electricity Act's article 63 instructs the Government's RE programme *to maximise the economic, social and environmental benefits of rural electrification subsidies*.

Increased electricity access facilitates greater income generating opportunities and allows the provision of better public services. Yet, it will not by itself transform the rural sector. The RE strategy maximises the economic, social and environmental benefits of rural electrification projects by co-ordinating the electrification programme with other Government programmes in rural areas, in particular, programmes in agriculture, communication, health services, education, water and transport.

Agricultural processing is the major commercial rural electricity consumer. As such, agricultural loads will be the "anchor" customers for many of the new rural electrification schemes thus supporting the Program for Modernisation of Agriculture. The national *health, water and education* programmes are implemented

in the form of packages that are tailor made to different sizes of rural communities and offered to these. Similar concepts are developed in the *telecom* sector in the form of “community electronic communication packages” integrating telecom, small radio to link up the community with modern centers, fax services, photocopying and PC. The RE-Agency will provide information on what type of energy services are best suited to fulfil the objectives of these programmes and that can be included as part of the packages.

### **3.5.7 Standardised Procedures for Small Power Producers**

Small power systems can play a key role in supporting expansion of electrification in Uganda. This is true due to (i) the current shortage of generation capacity; (ii) the lack of a widespread national power grid; and (iii) the dispersed nature of rural electricity demand, which makes mini-grids the least cost solution in many cases; and is well-matched by the location of Uganda’s dispersed renewable energy resources. Private producers bring finance and management expertise which is needed for operation and maintenance of such systems.

While there are thousands of diesels and other small generators currently in operation in Uganda, these are primarily used for private commercial or domestic applications in urban areas.

Commercially-based development of small-scale renewable energy power generation, utilising indigenous renewable energy sources such as bagasse, crop residues and mini-hydro will be facilitated, *inter alia*, by implementing a standardised transactional framework for contract, pricing and regulation.

Article 56 of the Electricity Act, 1999, requires “*the system operator, in consultation with the Authority, to publish standardised tariffs based on the avoided cost of the system for sales to the grid of electricity generated by the renewable energy systems of up to a maximum capacity of twenty megawatts.*”

## **4. Institutional Framework**

### **4.1 Rural Electrification Agency**

A **Rural Electrification Agency (RE-Agency)** will be established by the Minister of Energy and Mineral Development to carry out the Minister’s responsibilities with regard to Rural Electrification. The RE-Agency will report to the RE-Board; the cost of operation will be funded by the REF. The RE-Agency will be responsible for analysis of RE-policy issues (section 4.3), planning in collaboration with the System Operator, monitoring of Rural Electrification nationally, and information dissemination.

### **4.2 Project Sponsors**

Under the new decentralised, demand-driven approach, sponsors have a critical role in establishing rural electrification businesses. Private companies, NGOs, local authorities and communities will be the primary initiators of projects. Sponsors must satisfy two requirements: projects are not to be managed or majority-owned by the public sector and must demonstrate local community support. Community participation helps ensure that supply and service levels are appropriate to local requirements. The support of local communities is also valued by private companies who recognise that maintaining good relations with the community helps reduce the likelihood of conflicts over, for example, tariff increases.

Sponsors initiating RE projects will need to establish a legally recognisable entity (such as a co-operative or a company) in order to qualify for grant awards.

## **4.3 Institutions Involved in the Rural Electrification Policies**

### **4.3.1 The Rural Electrification Agency**

In the area of policy formulation and policy setting the role and responsibilities of the RE-Agency are the following:

- **Rural electrification reporting.** The RE-Agency will be responsible for assisting the Minister in the preparation of the annual report on the progress of the **RE Strategy and Plan**, as required in the Act, Section 64(ii), and periodic reformulation and updates of the plan;
- **RE Master Plan.** The RE-Agency will collaborate with the System Operator in the preparation and periodic update of the RE Master plan for rural grid electrification. The RE-Agency will be responsible for initiating the feasibility studies and co-ordination of plans for off-grid regional projects that are identified in the plan as priority projects;
- **Rural electrification database.** Section 67 of the Act states that “the Minister shall maintain a national rural electrification database to assist in the monitoring of progress and establishment of the targets for rural electrification.” This database will be created by the RE-Agency and will draw initially on UEB and other existing data to build a comprehensive ‘map’ of the extent of electrification needs and resources around the country;  
The database will consist of all executed and potential RE projects, all RE project applications and awards, and their progress. It will maintain a record of all donor and NGO RE projects that take place outside of the Government’s main RE programme. The database will hold all information generated by the Ministry on project opportunities, for example mini-hydro site inventories. These opportunities will be made public on a regular basis. It will collect cost and demand data on rural electrification and socio-economic data;
- **Information Services.** A critical function of the Agency is to make the information in the database easily accessible to the public, especially to existing and potential investors and others involved in rural electrification. This information is necessary to enable investments by reducing the cost and accelerating the timing of the exploratory phases of a rural electrification project; and
- **Advice on RE regulatory issues.** Through its involvement in the implementation of RE policy, the RE-Agency will develop strong knowledge and expertise of RE issues. The RE-Agency can provide feed-backs to the Electricity Regulatory Authority on regulatory issues where adjustments may be appropriate.

### **4.3.2 The Rural Electrification Board**

The **Rural Electrification Board** comprises the Permanent Secretaries of the Ministries of Energy and Mineral Development, Finance, Planning and Economic Development, Local Government, a representative of the donors, a representative of the private sector, a representative of civil society, a representative of the banking sector and a professional with expertise in regulatory matters

The RE Board shall:

- Discuss and approve the annual rural electrification report prepared by the RE-Agency for submission to the Minister of Energy;
- Define the policies for subsidy levels, project eligibility criteria and application processing and other procedures based on proposals made by the RE-Agency. The rules on this are included as part of the annual rural electrification report, which is submitted to the Cabinet; and
- Oversee the management of the Rural Electrification Fund, REF (see section 4.5.3).

## **4.4 Awareness and Capacity Building**

**4.4.1 The National Awareness Campaign** to publicise the change in policy, and the opportunities that arise from it to the private sector, local authorities and communities. The National Awareness Campaign will inform local authorities of their potential regulatory responsibilities, acquired by delegation from the ERA. It will educate consumers on the benefits and disadvantages of different electrification technologies and enterprises on the potential for productivity increases. It will explain the basis of the new tariff regime in an effort to limit concerns over tariffs that will often be higher than the current UEB tariff. Project sponsors will benefit from a RE information package containing information licensing and other requirements.

**4.4.2 Capacity building** services will be available across a wide range of fields necessary for the development of rural electrification businesses. These may include market assessment, preparation of business plans, evaluation and choice of technology options, investment promotion, financial advisory services, financial analysis, project finance, technical advisory services, product development, support to the organisation and management of small community utilities, tariff setting and accounting procedures. Capacity building will also be provided for relevant public sector staff at relevant national and local level.

## **4.5 The Rural Electrification Fund (REF)**

In accordance with Section 65 of the Act, “*the Minister shall establish a fund to be known as the Rural Electrification Fund*” (REF).

**4.5.1 Principles for Organisation** In the organisational set-up for the financial intermediation, there will be a clear separation between the institutional responsibility for (i) the awarding of grants/subsidies to investments in rural electrification and (ii) the provision of debt finance. The REF will deal with subsidies only.

For reasons of transparency and good governance there will be a clear operational division between (i) the definition of criteria, rules and principles for fund allocation and (ii) the processing and approval of funding applications from project sponsors.

**4.5.2 Funding** According to the Electricity Act, 1999, the moneys of the Fund shall consist of:

- Significant money appropriated by Parliament;
- Any surplus made from the operations of the Electricity Regulatory Authority;
- A 5% levy on transmission bulk purchases of electricity generation stations; and
- Donations, gifts, grants and loans acceptable to the Minister of Energy and Mineral Development and the Minister of Finance, Planning and Economic Development.

During the first years, the funds provided by the transmission levy will be low, of the order of US\$ 2-3 million, but will grow rapidly as sales in the interconnected grid increase in response to grid improvements and expansion in generating capacity. Therefore, the REF will initially be largely dependent upon contributions from donors.

**4.5.3 Management of the REF** The operation of organisations involved in the administration of funds from the REF will be overseen by the RE Board (see section 4.3.2).

In relation to the Management of the REF, the Board shall:

- Approve grants to be offered for new projects; and
- Approve the annual operating budget of the Fund

Processing and approval of funding applications will be undertaken by the RE-Agency. Once the funding has been approved by the RE-Board, the Trust Agent for the REF will administer the payments of funds to the applicant. The process will be subjected to close auditing of the flow of funds, of compliance with the criteria for the awarding of grants that are fixed by the RE Board, and of efficiency in the processing of applications and requests for funding. The results of the audits would be presented to the RE Board and be summarised in the annual report by the MEMD to the Cabinet on the status of rural electrification.

**4.5.4 Types of Investments Receiving Support from the REF - Three types of investment categories** qualify for subsidy assistance by the fund:

1. Rural electrification projects through expansion of the interconnected grid. This covers investments in transmission lines and in power distribution networks;
2. Isolated grid projects comprising generation and distribution activities; and
3. Stand alone systems using renewable energy, such as solar home PV systems

In addition to the window for providing **investment subsidies** to the above types of projects the REF may also **cofinance feasibility studies** for minor grid extension and isolated grid projects. A further option would be to establish an **environmental facility** within the REF to specifically promote projects using renewable energy and energy savings. Since a donor for domestic procedural reasons may insist on specific procedures to be followed for the flow of his funds specific windows can be opened for that purpose.

**4.5.5 Eligibility Criteria for Grant Support - Objective of fund support.** The objective of the Fund will be to get maximum access per invested subsidy amount subject to the satisfaction of regional equity requirements.

**Eligibility criteria for grants** will be established by “*open and public discussion*” in accordance with the Act. Eligibility criteria will include the institutional, financial and commercial viability of the project; project selection criteria will, in addition, comprise the satisfaction of the economic development, social and regional development goals for rural electrification. The criteria for fund allocation will be fixed in the annual report to the Cabinet on rural electrification.

The grant support will include a focus on providing electricity to local administration centres, health

facilities and community/social centres.

## **4.6 Role and Involvement of Financial Institutions**

The financial intermediaries have a dual role to play:

First of all, their involvement is essential to secure financial closure for RE projects.

Second, although in many projects, the funding in terms of loans from the financial intermediary will be lower than the subsidy amount provided by the REF, the participating financial intermediary will play the lead role in the due diligence evaluation.

## **4.7 Organisation of Regulation**

### **4.7.1 The ERA**

The Electricity Regulatory Authority (ERA) is responsible for regulating the electricity industry in the interests of both consumers and investors. Its functions are set out in Section 11 of the Electricity Act, 1999, its main roles being: (i) licensing of market participants; (ii) tariff setting; and (iii) setting and enforcing minimum safety and service levels, and encouraging the development of uniform electricity standards.

The regulatory regime for RE will be based upon the general regime for regulating electricity generation and distribution, differing in the certain respects outlined below.

**Licensing:** In the case of small rural electricity systems, the ERA has the power under Section 114 to grant exemptions from licensing. The projects will still need to register, and the absence of a licence does not preclude the ERA from exercising its other regulatory functions. The ERA will need to decide how to apply this regulatory framework to rural electrification meeting the essential objectives of protecting consumers' interests whilst minimising bureaucracy and the administrative load on the ERA and on project sponsors.

**Tariffs:** The ERA will define the tariff fixing methodologies for RE projects, in consultation with the RE-Agency. The methodology to be applied will balance the interests of producers and of consumers. Care will be taken to develop incentive based schemes that simultaneously promote the achievement of maximum access and of efficiency improvements.

**Minimum safety and service levels:** The ERA will need to devise appropriate minimum standards for the safety and service levels of RE projects.

**Procedures for grid extensions:** The distribution concessions created by restructuring of UEB will have licensed areas that extend only a short distance from the existing grid. Projects extending the grid beyond these licensed areas could, in principle, be undertaken by sponsors other than the existing licensees. A regulatory regime will need to be in place to facilitate such projects. Inter alia, a mechanism for calculating fair and appropriate wheeling charges will be required and compensation procedures for investors that are left with stranded costs by the expansion of the grid.

**Dispute resolution:** The ERA will be responsible for resolving disputes between producers and consumers.



Decisions by the ERA can be appealed to the Electricity Disputes Tribunal.

#### 4.7.2 Involvement of Local Authorities

For any small systems with generation of less than 2 MW or sales of less than 4 GWh, the Electricity Act contains provisions which allow ERA to delegate its regulatory powers to competent local authorities. The Government recognises that most local authorities will not have the required level of competence to act as regulators. In the longer term, the capacity building is expected to enable local authorities to perform an appropriate role.

Regulatory responsibilities will not be delegated to any local authority which is active as the sponsor of an electricity project. This is in order to prevent conflicts of interest arising. Any local authority entering into the role of a project sponsor must immediately declare its interest and surrender any existing regulatory functions to the ERA.

## 5. Electrification Targets and Funding Requirements

The primary target of the Government's RE Strategy is to provide access to 400,000 extra rural households by 2010. The details of this target are set out in the table below, which includes all electrification technologies. The column for the year 2000 provides an estimate of the current situation.

	<b>2000</b>	<b>2005</b>	<b>2010</b>
Rural areas			
Rural population	18.6m	20.2m	22.0m
No. of rural households §	3.8m	4.1m	4.5m
No. of electrified rural households	80,000*	164,000	450,000
<b>Rural electrification rate</b>	<b>2.1%</b>	<b>4%</b>	<b>10%</b>
Urban areas			
Urban population	3.4m	4.8m	6.0m
No. of urban households §	0.8m	1.1m	1.3m
No. of electrified urban households ^	170,000	220,000	295,000
<b>Urban electrification rate</b>	<b>21%</b>	<b>20%</b>	<b>23%</b>

Total

Total population	22m	25m	28m
Total no. of households §	4.6m	5.2m	5.8m
Total no. of electrified households	250,000	384,000	745,000
<b>Total electrification rate</b>	<b>5.9%</b>	<b>7.4%</b>	<b>13%</b>

To achieve this ambitious target, **the REF will need to disburse around US\$ 125 million in grants by the year 2010, an annual average of US\$12.5m.** The funding assumption is based on estimated investment costs per connected household of US\$400 to US\$800 for PV, US\$2,000 to US\$3,000 for mini-grids, and US\$1,000 to US\$2,000 for grid extension. The budget of the MEMD needs to be expanded to cover the cost of the RE-Unit.

## 6. Implementation Plan

Modalities for implementing the Rural Electrification Strategy and Plan will be put in place along the same time frame as UEB privatisation so that the plan is fully operational at the time when the concessionaires begin operations - June 2001. The tasks listed will be undertaken in consultation with all stakeholders particularly the donor community whose support will be required from the beginning. The main milestones of the Implementation Plan are:

- **An RE Board is to be set up by May 15, 2001.**
- **Setting up the RE-Agency** – this will involve the establishment of the Agency by statutory instrument (May 15, 2001); recruitment of staff, starting with the Executive Director (Sept. 1 2001); the identification and equipping of suitable premises; and the raising of finance from the donor community.
- Approaching the **donors to generate an initial amount of approximately US\$ 15 million** with firm pledges for the financial year 2002 onwards and initial bridging support during 2001.
- **Preparation of Rural Electrification Master Plan** should start the autumn of 2001 and be ready mid-2002.

**Renewable Energy Policy and Plan**  
**Government's Commitment To The Development Of New And  
Renewable Sources Of Energy**

## **1. Background**

Uganda has substantial renewable energy resources, comprising hydrological, biomass, solar, wind, and geothermal energy. Despite this abundance only biomass energy and hydropower contribute to the national energy balance. Biomass energy is estimated to contribute over 90% while hydropower contributes less than 2% of total energy consumption. The other new and renewable resources (small hydros, agricultural residues, solar energy, wind energy and geothermal energy) have negligible contribution.

However, Government is aware of the immense potential of the use of new and renewable sources of energy especially in providing decentralised energy services to rural populations. Due to the relatively good distribution of such resources like solar, wind and agricultural residues in the country and numerous small hydro resources in the mountainous areas along the Western and Eastern borders, it may not require heavy investment in energy distribution networks to provide the much needed modern energy to bring about rural transformation.

Government is also aware of the need to chart an ecologically sound path to sustainable development by investing increasingly in renewable energy resources, thus avoiding fossil fuel use that would otherwise be the alternative for areas remote from the grid.

In order to enable the development of renewable energy sources, therefore, Government has taken a number of steps that have included the establishment of an institutional framework for the promotion of renewable energy, initiatives to demonstrate the efficacy and potency of renewable energy technologies, support to the private sector to become the driving force in renewable energy project implementation and the development of an energy policy that promotes rural and sustainable development.

## **2. Institutional Framework**

The Government embarked on the development of a New and Renewable Sources of Energy (NRSE) division in 1991 that exists in the Department of Energy of the Ministry of Energy and Mineral Development. The division deals with issues of policy, monitoring, public awareness and promotion of the development of renewable energy sources.

Government also recognises the importance of organising the private sector and developing its capacity in the area of renewable energy. Therefore, a Uganda

Renewable Energy Association (UREA) was created with the support of Government to organise the private sector to sponsor and implement renewable energy projects. UREA is currently supported through the Uganda Photovoltaic Pilot Project for Rural Electrification (UPPRE) funded by UNDP/GEF. Starting with only 8 members, UREA membership has now increased to over 30. Government has enabled UREA member companies to build their capacity through training and provision of consultancy services in the areas of technical and business plan development, computer appreciation and usage and renewable energy technology marketing. UREA members are the direct beneficiaries of the UPPRE through extension of loans at less than half the market interest rates, organised by the project to procure solar PV equipment. The association has been able to design projects and business plans for donor financing as a result of the capacity building that has been extended.

### **3. Government Initiatives in the Promotion of Renewable Energy Projects**

Following the establishment of the Ministry responsible for energy affairs, Government started focusing on the development of renewable energy in the early 1990s. The driving forces were the oil crises of the 1960s and 1970s, like most countries world-wide and an enlightened leadership that recognised the benefits that could accrue from harnessing the huge renewable energy potential.

Subsequently, a number of feasibility studies were carried out in the areas of biomass and small hydros. Specific studies included ethanol production from sugar cane for substitution of gasoline and the mini-hydro sites of Ishasha and Nyagak. While ethanol production was found not to be economically feasible, the Ishasha and Nyagak projects are to form part of the ERT/AFRREI programme.

Preliminary studies were also carried out on 22 small hydropower sites, 10 of which have now been studied further up to pre-investment levels, with UNDP/SIDA assistance. Three of the 10 sites that have shown greatest economic sense have been taken up to pre-feasibility study level. Funds are being sought to do full feasibility studies on the three sites.

Other notable studies that Government has used to provide information to plan for renewable energy resource supply and use are the National Biomass Study, supported by NORAD (1991 – 95), and the Uganda Rural Electrification Strategy Study (1999 report) supported by ESMAP. The latter has made tremendous contribution to the development of the ERT Programme.

Government has initiated and supported projects to promote renewable energy technologies especially for providing clean energy services to the rural populations as well as reinforcing grid power supply. Recognising the constraint of grid extension to the rural areas and considering the dispersed nature of population settlement, Government realised that one of the most potent options to address these issues was the use of solar PV technology. Since 1998 the Ministry of Energy and Mineral Development has been implementing the Uganda PV Pilot Project for Rural Electrification whose main objective is to establish sustainable mechanisms for enabling PV technology access to off-grid rural areas by overcoming financial, social

and institutional barriers that presently exist. In this project, Government's role is to provide facilitation that includes negotiation for financing, public awareness, establishment of standards and capacity building while the private sector implements the procurement and installation of PV systems. The project is compiling lessons for the benefit of future projects.

Government is also facilitating the development of co-generation projects to interconnect with the grid. The first project, sponsored by Kakira Sugar Works Ltd, of 28 MW installed capacity, was helped to get its feasibility study done by a grant from USTDA with the help of the Government of Uganda. Negotiations are currently going on between the sponsor and UEB for a power purchase agreement for 18 MW, to be implemented under the ERT/AFRREI Programme.

Uganda's commitment to renewable energy development is also shown by its commitment to the UN Framework Convention for Climate Change. To that extent, the Government is lobbying fairly successfully the GEF and other international environmental agencies to support environmentally benign energy projects.

#### **4. Policy Direction**

Government is aware that the development and use of renewable energy sources to become a major component in the national energy balance is, to a large extent, dependent on a favourable policy. In this respect, Government has developed an energy policy whose main objective, inter alia, focuses on rural development and environmental sustainability. These two elements contain implicit promotion of renewable energy development. Specifically, the policy objective on renewable energy sources explicitly states that Government will support the development, promotion and use of renewable energy resources for both small and large-scale applications. In order to achieve this objective, the Government will put in place the following:

- i) Facilitate adequate financing mechanisms for renewable energy technologies to make them more accessible and affordable.
- ii) Promote the exploitation and use of renewable energy sources through comprehensive studies, packaging and staging road shows for potential projects.
- iii) Increase public awareness to show the efficacy and potency of renewable energy technologies.
- iv) Promote the development of the private sector to be able to implement renewable energy projects through capacity building.
- v) Establish standards and a legal and regulatory framework for renewable energy technologies to ensure quality service delivery.

**Additional  
Annex 14**

**Prototype Carbon Fund (PCF)**

The PCF intends to support the Project through the purchase of greenhouse gas emission reductions. Therefore, the PCF requires that the Project must meet all rules and requirements for CDM projects pursuant to Art. 12 Kyoto Protocol.

The set of PCF-specific documents includes the following:

- The *Project Design Document* presents an overview of the Project and summarizes its design elements as far as they are relevant from the perspective of the PCF and the CDM. The design document builds on the PCF Project Concept Note for the project
- The *Baseline Study* presents conclusive arguments and evidence for what would happen without the CDM intervention. The baseline study supports the argument that the business as usual scenario of increasing private ownership of gensets would continue for the foreseeable future. Please note that the baseline study builds the case on commercial investments and disregards the possibility that the WNHPP (or some other scheme) could go forward with development assistance funds.
- The *Monitoring and Verification Protocol* includes instructions on how to measure and calculate emission reductions and the project's contribution to sustainable development, and contains quality management and verification rules.
- A paper on *emission reduction projections*, which estimates, on a year by year basis, the emission reductions that the project can expect to generate.

An independent third party (the validator) will prepare a *Validation Report* that is expected to confirm that the project meets all relevant CDM criteria. The terms for a *host country agreement* with the Government of Uganda and for an *Emission Reduction Purchase Agreement* with the West Nile independent power producer (to be selected) are currently being prepared.

The PCF further requires that the Project meets all Bank policies and safeguards, in particular regarding stakeholder participation and environmental and social review. The attached Project Description Document provides PCF-specific details. An overall description of the West Nile investment is included in Annex 2.



Prototype Carbon Fund

Uganda WNHPP PDD

Final Draft: 23 August 2001

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# **Prototype Carbon Fund**

## **Uganda: West Nile Hydropower Project**

### **Project Design Document**

Final Draft – 23 August 2001

This Project Design Document (PDD) is provided in anticipation and for the purpose of the registration of the West Nile (WN) Hydropower Project (WNHPP) in Uganda as a Clean Development Mechanisms (CDM) project under Art. 12 Kyoto Protocol (KP). The PDD and its supporting documents (Baseline Study, Monitoring and Verification Protocol, etc.) describe the project design in regard of the objectives and requirements of and modalities for the CDM. The PDD is thus a key document for the validation of the project.

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## 1 Key Project Parameters

The following Table presents a summary of key project data. More information is provided in the following sections and tables and in the documents referenced in Section 8.

**Table 1 Project Summary**

<b>Project objectives</b>	Promote <b>socio-economic development</b> in rural Uganda, Reduce <b>CO2 emission reductions (ERs)</b> .
<b>Project location</b>	<b>North-western Uganda</b> , West Nile Region (bordering the Congo and the Sudan): Municipalities of Arua, Nebbi and Paidha (towns and commercial centers).
<b>Type of project</b>	<b>CO2 abatement: Fuel switching and energy conservation:</b> The project involves (1) the construction of two small run-of-river hydropower plants plus efficient diesel backup generators, (2) the development of an isolated mini-grid for regional electricity transmission and distribution, and (3) the replacement of inefficient, unreliable Uganda Electricity Board (UEB) diesel capacity and privately owned small diesel engines and generator sets.
<b>Project baseline</b>	<b>Business as usual scenario:</b> continuing growth in efficient small-scale private diesel and petrol based electricity generation capacity.
<b>Crediting period</b>	<b>Twenty years</b> (1st WNHP license): The project seeks Certified Emission Reductions (CERs) under Art. 12 KP for three 7-year “renewal” periods depending on baseline development.
<b>Estimated CO2 reduction</b>	Historic emissions: 2000: 19,000 tons, growing ca. 30 % Emission reductions (ERs): 2002 – 2007: 239,000 2008 – 2012: 467,000 2013 – 2021: 1,178,000 <b>20 years lifetime: 2002 – 2021: 1,884,000</b>
<b>Sources of ERs</b>	Only CO2. ERs will be achieved through (1) phasing out of UEB and private diesel and petrol-based generation, (2) reduced fuel transports to the West Nile, (3) reduced use of kerosene for lighting.
<b>Sustainable development impact</b>	<b>Rural development project in line with GOU sustainable development plans.</b> – Development target: Provide West Nile municipalities with reliable power. – Environmental target: Use of local renewable energy resources (small hydro). – Socio-economic objective: Increased commercial activity, better social services.
<b>Project financing</b>	The project is part of the Energy for Rural Transformation (ERT) Initiative of the Government of Uganda (GOU). The ERT is supported by the World Bank (IDA) and bilateral donors through contributions to the new Ugandan Rural Energy Fund (REF). Funding from the WNHP is anticipated as follows (US\$ million): <ul style="list-style-type: none"><li>• International investor (WNHP owner and operator): 15</li><li>• GOU/IDA/bilateral donors: smart subsidy through REF: 3.7</li><li>• GOU: Construction of regional transmission line: 2.1</li></ul> <b>Total project finance: ca. 21</b>

<b>Project revenues</b> (including sale of CO2 reductions)	<ul style="list-style-type: none"> <li>• Sale of electricity to local households, institutions and businesses under license of the Energy Regulatory Authority. Electricity tariffs to be determined by competitive bidding.</li> <li>• Sale of CO2 emission reductions (ERs) to the PCF and possibly other buyers.</li> </ul> <b>Estimated PCF purchase value: US\$ 3 million.</b>
<b>Host country approval</b>	The project was endorsed on <b>May 2, 2000</b> , by the Ugandan <b>National Focal Point</b> for the UNFCCC (Ministry of Water, Lands and Environment). Uganda is a Non-Annex I signatory of the UNFCCC and is preparing accession to the KP.
<b>Project start</b>	<b>2002</b> depending on tender and selection of WNHPP investor and operator.

## 2 Project Entities

The WNHPP has been developed in a cooperation between the GOU, the World Bank's ERT program and the PCF as well as other agencies and donors. The project will be implemented by an investor (WNHPP Operator), who will be selected through competitive bidding within the next months. The Project Operator will play a key role in implementing the project and in generating ERs through professional monitoring as provided for in the MVP.

**Table 2 Project Partners and Support**

<b>Project sponsor</b>	<b>Government of Uganda</b> <ul style="list-style-type: none"> <li>– Ministry of Energy and Mineral Development: Fred Kabagambe-Kaliisa (Permanent Secretary)</li> <li>– Ministry of Water, Lands and Environment, UNFCCC Focal Point: Apuuli Bwango, Commissioner for Meteorology, <a href="mailto:bapuuli@starcom.co.ug">bapuuli@starcom.co.ug</a> P.O. Box 7025, Kampala, Uganda, Tel: 256-41 251798, Fax: -251797</li> </ul>
<b>Project Operator</b>	<b>To be determined.</b> The WNHPP investor and operator will be selected through international tender conducted by the Ugandan Electricity Regulatory Authority.
<b>Project planning and assistance</b>	<ul style="list-style-type: none"> <li>– <b>World Bank</b>, Africa Department (1818 H St NW Washington DC 20433): Arun Sanghvi (task manager), <a href="mailto:asanghvi@worldbank.org">asanghvi@worldbank.org</a>, Tel: 1-202-458 2504</li> <li>– World Bank <b>Prototype Carbon Fund</b> (1818 H St NW Wash. DC 20433): Johannes Heister (env. economist), <a href="mailto:jheister@worldbank.org">jheister@worldbank.org</a>, Tel.: 458 4280</li> <li>– <b>Energy for Sustainable Development (ESD)</b>, UK: Mike Bess (Director, project consultant), <a href="mailto:Mike@esd.org">Mike@esd.org</a>, Tel: +44-1225-816808, Fax: -812103</li> </ul>

## 3 Project Background

The project to be supported by the PCF will be implemented by the World Bank's ERT/AFRREI program in the context of the ongoing power sector reform in Uganda and is thus fully consistent with the Bank's country assistance strategy. The project is part of a three-phase, ten-year pro-program Energy for Rural Transformation (ERT). ERT's purpose is to (i) develop Uganda's rural energy sector so that it makes a significant contribution to bringing about rural transformation and poverty alleviation, and (ii) to contribute to global environment protection by reducing green-house gas emissions through use of renewable energy.

The West Nile Region comprises the districts of Nebbi, Arua, Moyo and Adjumani. Arua has the largest population (estimated 850,000), followed by Nebbi (estimated 450,000 to-day), Moyo and Adjumani (estimated 110,000 each). Arua Municipality is the largest urban area in West Nile, and is one of Uganda's fastest growing urban areas. Paidha Municipality is the second largest urban area in the Region, and the largest in Nebbi District, with an estimated population of 20,000 in 1999. Paidha Municipality is the next largest urban area in the region, with an estimated population of 12,500, followed by Nebbi Municipality at just under 10,000 inhabitants.

The West Nile Region has the potential to be one of Uganda's more productive agricultural areas. Prior to 1979, it was one of the country's most developed areas; it is now rapidly recovering from decades of turmoil and neglect. It has several agro-ecological zones, ranging from dry-land savannah to highland tea and coffee zones. Historically coffee, tea, tobacco, cotton, ground-nuts and sesame (simsim) were the most important cash crops; at present, coffee and tobacco production are up. The lack of adequate and reliable electricity supply has seriously constrained the region's development, particularly in the agro-processing fields (e.g., coffee, cotton, tea, grain milling).

The Uganda Electricity Board (UEB), currently undergoing privatization, supplies some 840 customers in Arua, Nebbi and Paidha municipalities in the West Nile region, split by sector comprising roughly 60% business/commercial, 15% institutional, and 25% residential consumers. UEB has five diesel generators, four in Arua and one in Nebbi, with a current operating capacity of 776 kW. UEB operates a distribution grid in Arua supplying some 700 consumers, and very small distribution centers in Nebbi (some 80 consumers) and Paidha (some 30 consumers), with the latter two centers connected by a 24 km 33kV line.

Power from UEB is available only for four hours per day, between 7-11 p.m. This supply is erratic, and UEB estimates that it sheds over 400 kW each evening to grid-connected consumers. One component of the unmet demand is from the estimated 1,000 registered business establishments in Arua, Nebbi and Paidha municipalities. Arua is by far the most important economic center in northern Uganda, although Paidha is the region's fastest growing economic center.

The ERT Demand Surveys conducted by a local Ugandan and international team found that there are currently over 180 independent diesel generating sets (gensets), and a further 42 medium to large diesel mills (grain), with a total installed capacity of 2.86 MW, generating over 7.65 GWh per year. West Nile's urban consumers spend over \$6.5 million per year on petroleum fuels to cover costs of lighting and power. Excluding kerosene and transport costs, West Nile consumers spend \$ 0.65 per kilowatt-hour (Uganda Shillings (Ushs) 1,040 per kWh).

Diesel fuel is imported by tank truck into Uganda from Mombassa, Kenya (3,360 km overland). The current marketplace cost for diesel in Uganda is over US\$0.80 per liter, while the market price in West Nile is virtually pegged to the US dollar (economic cost of diesel fuel is pegged at about 60% of the above prices). Such pricing assures that electricity generated from small diesel generators will be too costly to drive and support long-term sustainable development, although, even with such high prices, the West Nile's economy has been growing at over 25% per annum over the past five years. Any CO<sub>2</sub> reductions achieved in Uganda by reduction of diesel fuel use is enhanced by reducing the transportation element for importing the diesel fuel (349 tons per year, valued at nearly \$400,000).

Until October 1999, all non-UEB sales of electricity were prohibited, and there are still wide-spread perceptions that selling electricity is "illegal". This is one of the factors that have prevented rationalization of non-UEB electricity and power generation in the region. Additionally, civil war in Uganda during the

1970s and early-1980s caused both a deterioration of electricity infrastructure and supplies, as well as investor confidence.

Because of the historical precedence and the perceived high risks these generation/distribution systems are currently unlikely to be attractive to potential private sector firms that would otherwise be interested in becoming generation and distribution concessionaires, unless a new innovative approach is put forward based on alternatives to diesel generation. While the West Nile is one of the most rapidly expanding economies in Uganda, the lack of banking and other financial and economic infrastructure adds to investor risk. Poor transport links, caused by political unrest in other parts of the country between Kampala and West Nile, further add to investor risk and accounts for why the current interconnected grid is nearly 200 km from the West Nile, and will not be connected to the West Nile in the near future. Finally, civil unrest in neighboring Congo and Sudan add further risk.

The existing baseline is privately owned small-scale diesel generation, and there is no other choice today that can be implemented in this part of Uganda without some outside intervention. The cost of operating the small diesel generators and diesel mills severely inhibits sustainable economic development in the region. But the relatively high capital costs of “small” renewable energy resources such as small (micro and mini) hydro also inhibit their development and needs an outside intervention.

In the past such interventions have proven difficult to design and implement. However, the CDM intervention presents a unique opportunity to design such leveraging that will increase investor confidence and returns, and have a high probability of developmental impact and economic success while securing carbon mitigation benefits that can easily be monitored and quantified.

#### **4 Project Description**

The WNHPP will develop the hydropower resources in the West Nile region by installing two run of river electric generation facilities on two rivers and operate the West Nile electric distribution system with focus on the three urban centers in the region (Arua, Nebbi, Paidha). The main components of the WNHPP are as follows:

- The sale of the UEB’s generation and distribution assets in Arua and Nebbi Districts.
- The construction of ca. 80km of sub-transmission line between Nebbi and Arua (built by the GOU and to be leased to the WNHPP Operator).
- The installation of two new efficient diesels (1 by 1.5 MW and 1 by 1.0 MW) as both base load during the construction of the hydro plants and later as peaking plant.
- The construction of a 5.1 MW hydropower plant at the Nyagak site in Nebbi District during Phase I of the ERT, and, two years later, the construction of a 1.5 MW plant in Olewa, Arua District.
- The upgrading and extension of the existing distribution networks in Paidha and Nebbi municipalities (in Nebbi District) and in Arua municipality (Arua District), the largest load centre in the West Nile region, and the connection of existing and new customers, including consumers who are currently operating their own small generation facilities.

Previous feasibility studies for such a configuration were carried out by the US Trade Development Authority (USTDA) and by consultants funded by the Dutch. The USTDA feasibility study recommended a 3,300 kW initial installation at Nyagak, in Nebbi District to serve the Nebbi-Arua regional demand. More recently, the Italian Aid Agency has recommended a 4,950 kW installation at Nyagak, and this has been endorsed by the ERT's technical specialists.

The WNHPP has been developed by the GOU with full assistance from the World Bank's ERT initiative. The WNHPP was identified at an early stage as a potential CDM project and financial plans were drawn up to include revenues from selling ERs.

The project's implementation requires approximately US\$ 21 million of investment. The WNHPP will be tendered internationally on a "build, own and operate" (BOO) basis with two 20-year licenses. The project is expected to receive financial assistance in the form of a one-time "smart subsidy" on the order of US\$ 3.7 million from the World Bank (IDA) and bilateral donors provided through the Ugandan Rural Electricity Fund (REF). The GOU is also building the transmission line between Nebbi and Arua at estimated cost of US\$2.1 million. In addition to revenue from electricity sales in the Region at tariffs to be approved by the Electricity Regulatory Agency, the project is expected to generate ca. US\$3 million in hard currency revenues by selling emission reductions to the PCF under a long-term contract, which is yet to be negotiated. The subsidy and the emission reduction revenue are necessary to make investment in the WNHPP attractive for an international independent power producer.

## **5 Global Environmental Benefits**

### **5.1 Project Baseline and Environmental Additionality**

Currently the baseline in rural Uganda is diesel. Renewable energy systems have not been able to compete without some type of financial intervention. The predominant reasons for this have been lack of legal and institutional framework for investment (specifically UEB's historical monopoly on generation and sales – the Ugandan electricity sector is now undergoing reform, which permits independent power production), and the high up-front investment cost. Additionally, the absence of a long-term domestic capital market and the perceived risks of foreign direct investment in rural Uganda have impeded investments in renewable electricity generation. The diesel baseline in most parts of Uganda is likely to be superseded eventually by the large dam hydroelectric power potential on the main Nile. But this is not expected to impact the West Nile region and other isolated grid project areas of Uganda in the next 10 - 20 years, and likely longer given reasons cited above.

A detailed demand survey in the West Nile Region has been carried out in August/September 2000 by the ERT team to establish the historic base-line, trend data and the reduction potential. The survey has produced information on relevant baseline and project parameters, in particular petroleum products consumption and power generation for business and house-hold use, road transport of petroleum fuels, other sources of GHG emissions, as well as power usage and the willingness to pay of businesses and households for improved power supply. In the case of power use, historical diesel fuel sales statistics have been collected for five-year period from which a baseline and growth trend is being established. This data set has been complemented by a diesel engine-generator inventory and heat rate approximation to verify applicability of the non-transport diesel fuel data to power use.

The baseline for the WNHPP has been developed in a formal Baseline Study which is part of the design documents for this project. The following Table presents an overview of the findings of the baseline study, its methodology and issues encountered. The brevity of description in the Table may lead to misinterpretations. Therefore, for detailed explanations, please refer to the full Baseline Study, which is part of the PDD.

**Table 3 Baseline and Additionality Issues**

<b>“Issue” Area</b>	<b>Explanation</b>
<b>Project baseline</b>	<b>Business as usual (BAU) scenario:</b> Continuing growth in efficient small-scale private diesel and petrol based electricity generation capacity for the foreseeable future.
<b>Baseline methodology</b>	<b>Risk-based scenario analysis:</b> The methodology evaluates the commercial risks of alternative plausible development scenarios and selects the least risky scenario in light of available technical, economic, financial and market information.
<b>Plausible scenarios</b>	(1) BAU, (2) connection to national electricity grid, (3) development of small scale hydropower in the Region (WNHPP) through foreign direct investment.
<b>Baseline drivers</b>	(1) <b>High risk</b> of large international investment in long-lived fixed assets such as hydropower. (2) <b>No consumer base</b> (no ability/willingness to pay) to recover unsubsidized costs plus risk premium, (3) <b>power shortage</b> in main grid.
<b>Geographical boundary</b>	For scenario analysis: <b>West Nile region</b> . For ERT Demand Survey and MVP: <b>UEB regional supply corridor</b> plus areas with existing auto-generation that is likely to be connected to mini-grid.
<b>System boundary</b>	WNHPP mini-grid (technical boundary) plus fuel transport to West Nile.
<b>Time boundary</b>	<b>Implicit in baseline:</b> Development of the baseline scenario will eventually catch up with the WNHPP, either through connection with the national grid or through commercial development of the Regions hydropower resources. This is a risk for the ERs from the project. The development of the baseline scenario over time is monitored by MVP indicators.
<b>Development boundary</b>	<b>Service equivalence</b> principle: Power sales by WNHPP in excess of baseline consumption is attributed to development affect and not counted towards project emissions.
<b>Leakage</b>	<b>No leakage</b> identified; positive spill-overs possible (technology transfer). Increased emissions due to development effect of WNHPP not counted as leakage (CDM objective).
<b>GHG coverage</b>	<b>Only CO2 is relevant</b> and can be claimed.
<b>Environmental additionality</b>	<b>Real ERs</b> are projected to be achieved against identified BAU (diesel) baseline, reduction in kerosene for lighting and fuel transports.
<b>ODA and environmental additionality</b>	<b>ODA excluded</b> from baseline assessment, which is based on commercial project without carbon value. ODA is supplemental, i.e. fills the financing gap <i>after</i> accounting for carbon revenues.
<b>Funding (ODA) additionality</b>	<b>No ERs for ODA</b> contributions to the project (through REF) will be granted. PCF funds are not ODA.

## 5.2 Monitoring and Verification

Instructions for monitoring, ER calculation and verification are contained in the Monitoring and Verification Protocol (MVP) for the WNHPP, which is part of the design documents. The following Tables presents an overview of the MVP. Please refer to the MVP for details.

**Table 4 Monitoring and Verification Provisions**

“Issue” Area	Explanation
<b>Monitoring</b>	<b>ERT Demand Survey in 2000</b> counted private gen-sets and estimated growth in BAU electricity generation and emissions. <b>MVP</b> monitorable indicators, monitoring and operational obligations, management responsibilities.
<b>Calculation of ERs</b>	<b>Method:</b> Excel spreadsheets model. <b>Concept:</b> Difference in generation efficiency in BAU an WNHPP scenario applied to baseline kWh generation. Diesel consumption in road transport of fuel. Kerosene used (2000 survey).
<b>Date needs</b>	Year 2000 baseline figures (survey), growth projections for year 2002-04, electricity sales growths from 2005 onwards from WNHPP customer database, project emissions from WNHPP technical database, technical parameters and assumptions.
<b>Conservative ER estimates</b>	Conservative parameters, growth rates, data selection and methodology. ERs systematically underestimated to offset potential of overestimation.
<b>Verification</b>	<b>ERs are verifiable:</b> MVP provides for <i>inter alia</i> monitoring management and operational system, clear responsibilities, transparent record keeping, training, quality control, auditing procedures and verification.
<b>Baseline, MVP revision</b>	Baseline scenario adjusts automatically when <b>MVP time indicators</b> are observed. Verifier can request revisions and “renewal” of crediting period. MVP can be modified with verifiers approval.
<b>Sustainable Development</b>	<b>MVP</b> defined target indicators for environmental and socio-economic performance: WNHPP assists with Uganda’s sustainable development objectives if project meets targets. GOU has final decision.

## 5.3 Emission Reduction Projections

The ERT Demand Survey has collected information on fossil fuel use and generation capacity in West Nile, which is summarized in the Baseline Study Annex 4. These findings plus assumptions for monitorable performance indicators have been used to run annual simulations of the MVP spreadsheet model for the 20 year period 2002-2021. The assumptions and model outputs are re-reported in the PCF WNHPP document “Emission Reduction Projections”.

The model was feed with data for three scenarios. All three assume that the BAU baseline will continue to hold (i.e. no grid interconnection, no commercial hydropower development). The middle scenario (no. 3)

assumes that, beginning in 2014, demand exceeds WNHPP capacity and the Operator adds a further 5 MW of efficient diesel capacity. The model results suggest that, in the period 2002 – 2021, the WNHPP can expect to achieve ca. 1,884,000 tons CO<sub>2</sub> re-ductions. Annual baseline emissions and ERs as well as cumulative ERs and a breakdown by key periods for this scenario are presented in Table 5.

An alternative scenarios (no. 2) assume the addition of new carbon neutral capacity (with a possi-bi-li-ty to earn more ERs). According to this scenario, total reduction can reach 2,031,000 tons CO<sub>2</sub> (2001 – 20021). The last scenario (no. 1) assumes load shedding and reversion to some private genera-tion (which is an unlikely option). ERs earned in this scenario level out from 2014 on with a slight decrease year on year due to a comeback of private generation. Total ERs in this scenario are 1,767,000 tons CO<sub>2</sub>.

**Table 5      Annual and Total Baseline Emissions and Emission Reductions (t CO<sub>2</sub>)**

(Scenario 3: further efficient diesel capacity addition)

<b>Year</b>	<b>Baseline Emissions</b>	<b>Annual ERs</b>	<b>Cumulative ERs</b>
2002		15,492.96	15,492.96
2003		19,720.75	35,213.71
2004		37,858.32	73,072.03
2005		43,514.18	116,586.21
2006		57,389.52	173,975.73
2007		65,256.95	239,232.68
<b>2002 – 2007</b>		<b>239,232.68</b>	
2008		74,260.35	313,493.03
2009		84,565.61	398,058.64
2010		94,064.06	492,122.70
2011		105,373.54	597,496.24
2012		108,926.38	706,422.62
<b>2008 – 2012</b>		<b>467,189.94</b>	
<b>2002 – 2012</b>		<b>706,422.62</b>	
2013		112,680.02	819,102.64
2014		116,646.61	935,749.25
2015		120,838.76	1,056,588.01
2016		125,269.87	1,181,857.88
2017		129,954.39	1,311,812.27
2018		134,907.91	1,446,720.18
2019		140,146.67	1,586,866.85
2020		145,685.54	1,732,552.39
2021		151,549.14	1,884,101.53
<b>2013 – 2021</b>		<b>1,177,678.91</b>	
<b>2002 – 2021</b>	<b>2,016,366.00</b>	<b>1,884,101.53</b>	

It is believed that the above results are careful estimates. However, they depend strongly on the as-sumptions made in the simulation regarding baseline growth rates. The simulation uses the following rates for growth in privately generated electricity in the BAU scenario:



**Table 6 Growth Assumptions for Baseline Electricity Generation (in %)**

Category	2002	2003	2004 – 2005	2006	2006 – 2010	2011 - 2020
<b>Business</b>	40	35	30	25	15	5
<b>Institution</b>	16	14	12	10	10	5
<b>Residential</b>	40	35	30	25	15	10

Please note that, contrary to the ER simulations, the MVP will use observed growth rates beginning in 2005 based on actual sales figures of electricity. Therefore, depending on the factors that play out in the WN Region over the lifetime of the project, actually achieved ERs, as would then be computed by the MVP based on observed indicators, could differ significantly from the above simulation results. Considering that the strong growth in private generation seen between 1996 and 2000 (50% for businesses and households) could – under favorable conditions – continue into the next decade and would then show up in sales growth, the above simulation results appear to be conservative estimates.

## 6 Local Environmental and Socio-Economic Benefits

The project, being a typical rural development project, is expected to have very significantly positive impacts on the way people live in the West Nile. In addition, as a World Bank project it will have to comply with the Bank's environmental and social safeguard policies. The following Table 7 summarizes the project's local and environmental benefits.

**Table 7 Domestic and Local Project Benefits**

<b>“Issue” Area</b>	<b>Explanation</b>
<b>Local environmental benefits</b>	<ul style="list-style-type: none"> <li>– The project puts power generation in the WN on a low impact path (low impact small scale hydropower, options for other renewables).</li> <li>– Less diesel and petrol use in the project area with associated reduction in emissions from engine and gen-set operation and fuel transportation (CO<sub>2</sub>, SO<sub>2</sub>, NO<sub>x</sub>, hydrocarbons, noise, soil and water contamination, road congestion, etc.).</li> <li>– Availability of affordable electricity to household will also reduce fuel wood use and indoor air pollution with associated positive health effects.</li> </ul>
<b>Socio-economic benefits</b>	<ul style="list-style-type: none"> <li>– The project will allow the WN to exploit its significant economic potential.</li> <li>– The project improves the social conditions through creation of employment and better conditions for health care and education. The ERT program and the WNHP include components, which will facilitate the use of the new power supply for productive and social purposes. (2000 Survey: over 70% of all power generated goes to productive uses, 25% to hospitals, schools, public services.)</li> <li>– The involvement of the local business community and administration in project implementation and administration will boost self-governance in line with Uganda's decentralization policy.</li> </ul>
<b>Capacity building</b>	<ul style="list-style-type: none"> <li>– Project implementation includes capacity building components to enable the local community to contribute to, and administer its involvement in, the project.</li> <li>– The WNHP Operator is expected to use local labor and develop and transfer skills in the process of implementing and operating the project.</li> </ul>
<b>Technology</b>	<ul style="list-style-type: none"> <li>– Introduction and demonstration of modern, environmentally friendly power production techniques for rural electrification and transformation of rural economies</li> </ul>

<b>transfer</b>	<p>are an explicit objective of the project.</p> <ul style="list-style-type: none"> <li>– The demonstration that ERs from renew-able energy can earn additional income and the introduction of CDM know-how is expected to raise en-viron-mental awareness in Uganda and create interest in low carbon energy technologies.</li> <li>– The WNHPP and other ERT assistance assures that renewable energy is introduced successfully into Uganda and replicated in other regions. Similar opportunities including CO2 reductions are available in rural Uganda.</li> </ul>
<b>Host Country criteria</b>	Specific Ugandan requirements for CDM projects have not been worked out yet. The GOU (Min. for Energy and Mineral Development, UNFCCC Focal Point) have indicated their support for the project (letter of endorsement). The project supports the GOU rural development strategy; it is part of the ERT, in which the World Bank and GOU participate. The project is consistent with the World Bank's Country Assistance strategy.
<b>Sustainable Development Criteria</b>	No specific Ugandan criteria for sustainable development are known. The MVP monitors sustainable development against environmental and socio-economic targets that will be agreed with the WNHPP Operator.
<b>Environmental Impact Assessment (EIA)</b>	<ul style="list-style-type: none"> <li>– An EIA will be carried out by the selected WNHPP operator under Ugandan law and in consideration of World Bank safeguard and policies as part of the detailed project design. Typically, small scale run-of-river hydropower projects have very limited environmental impacts.</li> <li>– The Validation Report and Opinion will be preliminary until the validator has confirmed the EIA.</li> </ul>

## 7 PCF due Diligence and Expected CDM Process Requirements

In anticipation of implementation of the CDM the PCF attempts to meet the (emerging) CDM requirements and modalities also with regard to a due process as far as this is possible at this time and without established CDM institutions in host countries and at the UNCCC level. The following Table contains special process level requirements the WNHPP is expected to meet.

**Table 8 Other PCF and CDM Requirements**

<b>“Issue” Area</b>	<b>Explanation</b>
<b>Project risks</b>	<ul style="list-style-type: none"> <li>– A PCF risk assessment has been conducted to study project risks and mitigation options (a summary is available).</li> <li>– Project and base-line risks have played a key role in baseline determination and are laid out in the Base-line Study. Risks pertaining to the calculation of ERs are covered in the MVP.</li> <li>– The envisaged long-term ER purchase agreement between the PCF and a WNHPP investor and Operator is expected to mitigate investment risks significantly, as the contract will guarantee a stream of US\$ payments in return for verified ERs.</li> </ul>
<b>World Bank standards</b>	The project is part of the PCF and World Bank Africa region project portfolio. As such is has to meet World Bank project standards, in particular safeguard policies. This is assured by Bank Task Management in following Bank project preparation and quality assurance procedures.
	– Social intermediation in the West Nile Region (Arua, Nebbi, Paidha) was

<b>Local stakeholder participation</b>	<p>carried out by Action Aid (Uganda) and Community Empowerment for Rural Development. Their report is available. Comments received were used in the design of the WNHPP.</p> <ul style="list-style-type: none"> <li>– World Bank missions have held discussions with local communities (business men, local politicians), who are expected to take a stake in the distribution and utilization of hydropower in the West Nile.</li> <li>– Further stakeholder participation is expected to be conducted by the WNHPP operator in the course of the detailed design of the project.</li> <li>– Uganda is a member of the PCF Host Country Committee (HCC) and has been actively represented by the National Focal Point.</li> <li>– PCF has held a highly interactive “pre-negotiations” workshop in Kampala in May 2000 to engage Uganda officials in preliminary discussions about the planned ER purchase and ensure fair negotiations.</li> </ul>
<b>Public comments to validator</b>	PCF discloses the PDD, baseline study and MVP on its website during the validation period and invite comments from Parties, stakeholders and NGO’s for consideration by the validator.
<b>Validation</b>	PCF has selected Société Général de Surveillance (SGS) to confirm that the project meets (emerging) CDM requirements (validation) and to provide a Validation Report and Opinion. SGS is a recognized environmental certifier with a track in CDM projects.

## 8 Project Documents

The following documents have been prepared in the course of the design of the WNHPP as a (prospective) CDM project and support the project design as presented above.

- PCF (2001): Uganda: WNHPP – Project Design Document.
- PCF and ESD (2001): Uganda, WNHPP – Baseline Study (including a list of experts contacted during the project design work)
- PCF and ESD (2001): Uganda: WNHPP – Monitoring and Verification Protocol (includes Excel Workbooks for emission reduction calculation)
- PCF and ESD (2001): Uganda: WNHPP – Emission Reduction Projections
- PCF Risk Assessment
- Report on Social Intermediation
- Host Country Endorsement

Additional background information, work material, data collections and contact information is available for validation purposes from the organization that assist with the design and implementation of this project.

**Additional  
Annex 15**

**Uganda Energy for Rural Transformation Project  
Project Supervision Plan**

This project represents both the first rural electrification APL as well as the first GEF Strategic Partnership. In addition, the project promotes a new approach to rural electrification and renewable energy delivery. A Quality Enhancement Review (QER) Panel report (August 2001) noted that the project design represents "a new product for the World Bank" whose successful introduction will require well above average supervision in the early years to provide the necessary degree of high quality Bank support and nurturing as well as learning inherent in an APL and in any new product design. In light of this, highlighted in Section F of the PAD, the key elements of the supervision plan are:

**Continuity of the Task Team** –The continued participation in implementation of the preparation task team has been identified by OED as an important element of project success and emphasized in the QER panel as well. This is especially true in projects such as this one which involve innovative features that are likely to require some adaptation in the early years of the project. For this reason, the supervision plan calls for the following key task team members to continue their involvement to the extent feasible in the first two years of project implementation. These are planned to devote significant time to project startup and initial implementation in project year one as shown below. Supervision levels in the second year of the project could be reduced to 60-80% of these levels, depending on year one progress.

### Initial Project Supervision Team

Team Member	Specialty	Estimated Supervision Days in Project Year 1
<b><i>Ongoing Team Members</i></b>		
Arun Sanghvi	Lead Energy Specialist & Task Team Leader	30
Peter Smith/Rob Schware	Lead Telecommunications Specialist	25
Mac Cosgrove-Davies	Sr. Energy Specialist – (day-to-day project implementation)	50
Trine Refsbaek	Cross-Sectoral Expert	80
	Sr. Procurement Specialist	10
	Financial Management Specialist	15
Subodh Mathur	Project Concept/design (consultant)	30
Wolfgang Mostert	Rural Electrification Policy and RE Fund Arrangements (consultant)	20
	Power generation subproject implementation expert, – e.g. West Nile, Kisiizi (consultant)	40
	Rural Business, Solar Market Development, and Financial Intermediation Specialist (consultant)	55
<b><i>Additional Supervision Team Members</i></b>		
	Implementation Consultant (International)	80
	Implementation Consultant (Local)	80

**Strong in-country presence** – There is no substitute for country presence in early identification and resolution of project issues. The supervision task team will therefore include an implementation specialist, who will be available half time (~120 days) and spend about 100 days in country during the first two years. This person, for whom bilateral donor support is being sought, will be the primary local World Bank supervision team member. In this capacity, (s)he will facilitate in procurement matters, interact directly with public and private sector project stakeholders on day-to-day project issues, and act as the Bank’s representative for the project. The cross-sectoral expert also will be resident in Uganda for a similar amount of time to focus on this specific aspect of project implementation. After the first two years of the project, the required level of continued local supervision support will be assessed.

**Local supervision capacity building** - To ensure capacity building within the supervision process as well, the implementation specialist will be assisted by a Ugandan mid-level consultant with a similar time commitment, but a permanent local residency.

**Three supervision missions** are planned for the first year of the project. The **first mission** will directly follow Board presentation. This mission will seek to maintain project momentum through meetings and seminars with project stakeholders and members of civil society. Also, while bilateral donors have consistently expressed interest in supporting the Energy for Rural Transformation Program, they have at the same time indicated that firm commitments would be considered only after the program is established. This mission will therefore be the first opportunity to concretely engage other donors in support for the Rural Electrification Fund and other potential areas of involvement. The mission will also meet with the

Rural Electrification Board and, among other matters, review progress in staffing of the Rural Electrification Agency, especially in selecting the manager.

The **second mission** will be for the Project Launch, directly following project effectiveness. This will include a Project Launch Workshop and side meetings to review the Project Implementation Plan and reinforce specific implementation issues, including social and environmental safeguards as well as procurement, disbursement, and financial management. The mission will also assess implementation progress on the initial subprojects, such as West Nile, the IFC-supported investment, Kakira, and Kisiizi.

The **third mission**, about three months after the Project Launch mission, will be the first supervision mission. It will focus on key project issues which have arisen in the first months of the project. These are expected to include establishment of the RE Board/Agency/Fund as working entities, cross-sectoral implementation details, discussions with potential new project sponsors being assisted through the PSF, flow of funds to the initial investments, procurement issues, orienting new consultants, etc.

**REF Expert Panel** – The importance to the success of the project of a properly run Rural Electrification Fund cannot be overstated. At the same time, as indicated in Section F, there are substantial risks of the fund being subject to political capture or other abuse. Moreover, even with these risks well managed, there is a potential for the fund to miss its primary objective of facilitating a rapid increase in rural electricity access. Finally, the operation of the Ugandan RE Fund will serve as a model for other similar funds elsewhere in the region and worldwide. Given the high stakes involved in the success of the fund the supervision plan includes a REF Expert Panel which will focus on its effectiveness in subsidy intermediation. The Panel will monitor the operation of the REF and apprise the Government and the Supervision Team on emerging issues and recommended mitigating actions. The Panel will be comprised of three members: a Ugandan national, one national from another developing country, and a representative from the donor nations. Donor support is being sought to finance this activity.

**Supervision Cost** – Adequate project supervision will require a budget of about \$500,000 in year one, \$500,000 in year 2 and \$400,000 in year three as shown in the budget summary below. These costs are expected to be met through a combination of funding sources: Bank BB, GEF BB, PCF BB, and donor assistance.

**Estimated Supervision Costs (US\$000)**

	<b>Salary/Fee</b>	<b>Travel/Subsistence</b>	<b>Total</b>
<b>FY01</b>			
Bank Staff	90	70	160
Consultants	180	115	295
REF Expert Panel	30	15	45
<b>Total FY01</b>			500
<b>FY02</b>			
Bank Staff	100	45	145
Consultants	200	75	275
REF Expert Panel	40	40	80
<b>Total FY02</b>			500
<b>FY03</b>			
Bank Staff	85	35	120
Consultants	150	50	200
REF Expert Panel	40	40	80
<b>Total FY03</b>			400
<b>FY04</b>			
Bank Staff	70	30	100
Consultants	90	30	120
REF Expert Panel	40	40	80
<b>Total FY04</b>			300

## **Additional Annex 16**

### **Environmental and Social Management Framework (ESMF): Executive Summary**

#### **EXECUTIVE SUMMARY**

##### **Background**

The Government of Uganda has embarked on a large-scale program entitled Energy for Rural Transformation (ERT) which will bring electricity to currently unserved rural areas. The program is aimed at catalyzing economic transformation of the rural economy through provision of energy services. In keeping with the Electricity Act of 1999, which provides for private provision of such electricity services, the ERT Program will facilitate the private sector as the primary service provider. The Program will support financial intermediation for the investment projects in two ways. i) facilitate lending from local financial institutions; and ii) support creation and operation of a Rural Electrification Fund, also established under the Electricity Act, to provide initial capital subsidies for the private rural electrification subprojects which thereafter will operate in a commercial manner. The Government has requested World Bank assistance in implementing the ERT program.

The World Bank support for the ERT Program is proposed as a 10year Adaptable Program Loan, supported by three separate but linked credits roughly equal in duration. Electricity is not a final product itself, but rather an intermediate product, the value of which is determined by the uses to which it is put. For this reason, the ERT Program explicitly includes links with electricity consuming sectors of the economy. The Program includes an investment component aimed at rural telecommunications, as well as energy assistance to Health, Agriculture, Education, and other sectors.

The purpose of the proposed long-term program is to develop Uganda's rural energy and information sectors - with a focus on the energy sector - so that they make a significant contribution to bringing about the economic transformation of the rural economy. In addition, the global objective of the program is to contribute to global environmental protection by promoting the use of stand-alone solar photovoltaic (PV) systems and the generation of conventional power from - small renewable energy resources.

All investment projects within the ERT Program must comply with environmental and social safeguard policies of the Government of Uganda as well as the World Bank. Since the ERT Program will support investments brought by the private sector on a "demand driven" basis, the specific investments to be supported by the program are not known in advance. For such "Financial Intermediary" projects, the World Bank requires that a framework be adopted for ensuring compliance with environmental and social safeguard policies.

##### **Objective**

The objective of this document is to present the Environmental and Social Management Framework for investments under the Energy for Rural Transformation Program.

##### **Project Description**

The type of investment projects to be undertaken under the ERT Program can be divided into five main



investment components plus a capacity building component:

1. Grid extensions for larger communities (i.e. connecting rural areas to the main electricity grid network);
2. Independent grids for clusters of customers too small and/or too distant from the National Grid to justify interconnection;
3. Solar photovoltaic (PV) systems for isolated or dispersed customers;
4. Energy packages for health, agriculture, education, and water sector consumers,
5. Rural Information and Communications Technology packages, providing telecommunications access for rural customers
6. Capacity building for program stakeholders in the public and private sectors, NGOs etc.

### Applicable Safeguard Policies

In general, ERT investments are expected to be small in scale, with limited impacts relating to environmental and social safeguards. Even so, the potential exists for impacts - either positive or negative - and an assessment and mitigation strategy must be prepared where needed.

No single ERT investment is, expected to invoke all of the safeguard policies that are potentially relevant to the sector. In fact, it is entirely possible that some of the safeguard policies discussed below will not be invoked by ERT investments. However, due to the uncertainty of the demand-driven approach, all safeguards with potential application are treated within this Framework.

The Safeguards which could reasonably be expected to be invoked by some ERT investments are:

1. Environmental Impact Assessments (EIAs) requirements according to WB guidelines and GoU regulations (NEMA);
2. Natural Habitats, including conservation areas, flora and fauna;
3. Forestry, including natural forests and plantations that may be lost as well as critical habitat areas;
4. Cultural Property relating to safeguarding cultural heritage;
5. Involuntary Resettlement including Compensation caused by the project
6. International Waterways, concerning international agreements;
7. Safety of Dams relating to quality control of technical designs;
8. Disclosure.

In addition, a number of other key issues such as health impacts, impacts on landscape and pollution are addressed separately in parts of the report.

### Existing Safeguard Policies

The general policies for Environmental Impact Assessments in Uganda are the best developed among the Safeguard issues and are outlined in various statute supplements. The general policy for carrying out EIAs is to foresee, eliminate and mitigate adverse impacts relating to development projects. In addition, the EIA process should be Inter-disciplinary, fully transparent and serve as a balance between environmental, economic, social and cultural values for sustainable development in the country.

The Ministry has participated in environmental reviews, but not in monitoring. The NEAP for Uganda (June 1995) requires that each sectoral Ministry have an Environmental Liaison Unit (ELU). With regard to rural electrification, this ELU be created within the Rural Electrification Agency.

NEMA is responsible for the review of the EIA and the monitoring of the implementation of environmental mitigation measures. They have experience and capacity to review but have limited capacity to monitor and

follow up. The staffing of NEMA was at inception kept low, as NEMA staff would not participate in EIA and that their role in monitoring would be a shared responsibility or designated to the Lead Agencies. The current situation is that NEMA is overwhelmed with work and the Lead Agencies have more or less relinquished their roles to NEMA which is now faced with the following problems although some of them are being addressed.

- Funds available for field visits are scarce.
- Inadequate human capacity to conduct environmental reviews, auditing, monitoring and training.
- Lack of equipment to conduct on spot checks during monitoring (e.g. mobile labs).

The District Environment Committees (DECs) and District Environment Officers (DEOs) are appointed but their operations seem to be limited by funding at the district level. Many of the DEC's and DEOs received training from NEMA but are yet to transfer the same skills and experience to county and sub-county levels.

#### Available Capacity and Expertise for Studies

Most of the Environmental Impact Assessments and Audits are conducted by Consultants. There are a total of 43 firms registered with NEMA. These firms have a range of professionals in different fields capable of conducting EIA's, but rely on freelance consultants to build full EIA teams. There are probably no such firms based outside the Kampala metropolitan region. The capacities of the firms are good, i.e. there is always sufficient firms to bid for EIA jobs, but the quality of the work is not always up to international standards.

The capacities and the expertise of the developers to carry out implementation of environmental management issues vary. It is difficult to evaluate them as a whole group, but in general there is limited interest and expertise to do extensive environmental management and implementation, and the level of activity is dependant on the follow up and monitoring of NEMA.

#### Impacts and Mitigation Measures

The various potential environmental impacts and possible mitigation measures of future Rural Energy Projects are assessed. Electric power transmission systems (small hydro, bagasse co-generation, biomass gasification, diesel generators etc.), may affect the biophysical and human environment despite their small-scale and limited impacts.

Major negative environmental impacts could include:

- Impacts on the biophysical environment; include habitat disturbance, vegetation change, wildlife/biodiversity loss, soil degradation/erosion and siltation, air and water pollution and sedimentation.
- Impacts on the human environment include the possible loss of agricultural land, resettlement, increase in water-borne diseases, population influx and loss of aesthetic features.

#### Guidelines for Assessment and Mitigation

WB and NEMA guidelines for conducting environmental and social assessments have similar aims and requirements.

Environmental Impact Assessment (EIA) Guidelines have been developed specifically for the Rural Electrification Subsector. EIA has clear procedures which vary in breadth, depth and type of analysis depending on the project or project category. However, specific criteria will need to be defined on a project by project basis in addition to generic guidelines outlined in this report.

Guidelines for resettlement and compensation are outlined as part of a socio-economic study. There are clear rules and procedures for land acquisition and compensation as well as strategies for livelihood restoration and grievance procedures. However, WB guidelines require compensation in the form of land for land, income restoration and livelihood development, and long-term monitoring to ensure that people, are not worse off than before the project. This additional requirement to existing Uganda law will mean that an agreement between the WB and concerned authorities will need to be worked out. It is likely that the developer be required to pay additional compensation. The report outlines baseline data collection requirements, provides an overview of possible project impacts and suggests possible mitigation measures for the four main types of ERT projects, that is hydropower, grid extension, diesel/co-generation and PV systems.

#### Policy, Legal and Administrative Framework

There is no specific organisational structure for EIA Implementation. EIA should be integrated into existing structures for environmental management in Uganda. However, there are a number key players with different roles. These include National Environment Management Authority (NEMA), Directorate of Water Development, Uganda Wildlife Authority and Uganda Electricity Regulatory Authority.

During the planning stages of the project it will be necessary to assist local authorities in dealing with project impacts and as a liaison between project developers and affected populations. The composition of a committee (ERT Development Committees) to address issues will vary according to the affected project area and population but important political leaders, influential persons and the developer should be represented. The committee will liaise with the developer and facilitate project activities. In exchange members would receive support, training and reimbursement.

#### Public Consultation and Participation

This will be an on-going activity throughout the project cycle to enable the affected people, beneficiaries, the developer and any other stakeholders iron out any unanticipated situations.

Participation will evolve around the provision of a full opportunity for involvement of all stakeholders.

Public consultation will take place before the inception of the project, during and after the environmental and social assessment studies, during the public hearing and during the assessment and valuation exercises to mention but a few.

#### Disclosure and Monitoring.

Disclosure procedures ensure stakeholder involvement and transparency. Both WB and NEMA approaches are similar and complementary in this respect and suitable for ERT projects.

Key monitoring indicators for environmental and social aspects are outlined for participation and implementation. The key issues include monitoring of water quality, biodiversity indicators, agricultural production, income generation, health and population influx. For long-term monitoring a table is provided which outlines indicators, baseline data and targets. The goal with such monitoring is to measure the success rate of the project and determine whether interventions have resulted in dealing with negative

impacts and whether further interventions are needed or monitoring is to be extended in some areas. Monitoring indicators will be very much dependent on specific project contexts.

#### Safeguard Management Plan.

A safeguard management framework has been developed to fill the gaps identified in the existing safeguard structure. The Safeguard Management Plan will consist of:

- Institutional arrangements that include the formation of an Environmental Liaison Unit
- Establishment of an Environmental and Social Unit in the Rural Electrification Agency in the Ministry of Energy and Mineral Development.
- Agreements on 'gaps' between legal requirements under Uganda law and WB guidelines (especially regarding compensation and resettlement procedures)
- Completion and approval of a detailed set of generic safeguard management framework based on this report, including assessment guidelines, mitigation plans, consultation and disclosure arrangements.
- Capacity building and institutional strengthening that consists of workshops/seminars comprising top management of consulting firms, EIA practitioners, Environment Liaison and Rural Electrification Unit Officers, Environmental Inspectors and District Environment Officers, and developing a list of Consultants of EIAs of ERT Projects;
- Development of a National Level Monitoring System by establishing environmental performance indicators, developing standard recording formats and carrying out evaluations every three years.

