



EAC Strategy to Scale-Up Access to Modern Energy Services



Uganda Country Report and Implementation Workplan

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Abbreviations

AfDB	African Development Bank
CBO	Community Based Organisation
CSO	Civil Society Organisation
DWD	Directorate of Water Development
EAC	East African Community
EAP	Energy Advisory Project
EIA	Environment Impact Assessment
EIU	Energy Institute of Uganda
ERA	Electricity Regulatory Authority
ERD	Energy Resources Department
ERT	Energy for Rural Transformation
EU	European Union
GDP	Gross Domestic Product
GEF	Global Environment Facility
GTZ	Gesellschaft für Technische Zusammenarbeit (German Technical Cooperation)
HC	Health Centre
HFO	Heavy Fuel Oil
ICS	Improved Cooking Stoves
IRDI	Integrated Development Initiatives
JEEP	Joint Energy and Environment Project
KfW	Kreditanstalt für Wiederaufbau (German Development Bank)
kgOE	kilogram of Oil Equivalent
LC	Local Council
LC III	Local Council Three
LPG	Liquefied Petroleum Gas
MDGs	Millennium Development Goals
MFIs	Microfinance Institutions
MEMD	Ministry of Energy and Mineral Development
MOES	Ministry of Education and Sports
MOFPED	Ministry of Finance, Planning and Economic Development
MOH	Ministry of Health
MOLG	Ministry of Local Government
MOWE	Ministry of Water and Environment
MTTI	Ministry of Tourism, Trade and Industry
NDP	National Development Plan
NEMA	National Environment Management Authority
NIMES	National Integrated Monitoring and Evaluation Strategy
NGO	Non Governmental Organization

NR&SE	New and Renewable Sources of Energy
NUSAF	Northern Uganda Social Action Fund
PEAP	Poverty Eradication Action Plan
PFA	Prosperity for All
PMA	Programme for Modernisation of Agriculture
PMAU	Poverty Monitoring and Analysis Unit
PMU	Project Management Unit
PPP	Public Private Partnerships
PRSP	Poverty Reduction Strategy Paper
PSFU	Private Sector Foundation Uganda
PV	Photovoltaic
REA	Rural Electrification Agency
REB	Rural Electrification Board
REF	Rural Electrification Fund
SACCOs	Savings and Credit Cooperative Societies
Sida	Swedish International Development Agency
SWAP	Sector-Wide Approach
SWOT	Strength, Weakness, Opportunities and Threats
TOE	Tonnes of Oil Equivalent
TOR	Terms of Reference
UBOS	Uganda Bureau of Statistics
UEB	Uganda Electricity Board
UEDCL	Uganda Electricity Distribution Company Limited
UEGCL	Uganda Electricity Generation Company Limited
UETCL	Uganda Electricity Transmission Company Limited
UIA	Uganda Investment Authority
UMA	Uganda Manufacturers Association
UNBS	Uganda National Bureau of Standards
UNDP	United Nations Development Programme
UPE	Universal Primary Education
UREA	Uganda Renewable Energy Association
VAT	Value Added Tax

Exchange Rate (21st January 2007): 1 US\$ = 1700 Ug. Shs.

1.0 Current Status of Energy Access

1.1 Baseline Energy Access Data

Uganda's consumption of energy is very low. Total energy consumption in Uganda in 2005 was estimated as 8 984 508 Tonnes of Oil Equivalent (TOE). The energy consumption per capita was 330 kilogram of Oil Equivalent (kgOE); and commercial consumption per capita was 23.5 kgOE. Electricity consumption per capita was 22 kWh/yr.

In terms of prices, current prices of fuels are shown in Table 1.

Table 1: Energy Prices and data trends

Energy Type	Price (US\$/kg or US\$/kWh)	Price Trends
Fuel wood (Kampala)	0.07	Increasing at 10% p.a.
Fuel wood (Outside Kampala)	0.04	Increasing at 10% p.a.
Charcoal (Kampala)	0.21	Increasing at 10% p.a.
Charcoal (Outside Kampala)	0.10	Increasing at 10% p.a.
Kerosene	1.17	Increasing by about 20% p.a.
LPG	2.44	No significant change
Diesel	1.37	Increasing by about 20% p.a.
Petrol	1.49	Increasing by about 20% p.a.
Grid Electricity (without VAT)	0.25	Increased from 0.17 in 2006

It is important to note that through budgetary provision, Government subsidizes the cost of electricity to every consumer. Uganda currently spends about \$70 million as subsidy annually which is about 35% of the tariff. Government also controls the prices of electricity through the electricity regulator. As an example, a recent application by the distributor to increase tariffs by 20% was rejected on the grounds that there was provision in the Government budget to cover increased cost of electricity from use of diesel. There is a standard feed-in tariff payable by the grid operator.

In contrast, the petroleum sector is fully liberalized. Taxes of petroleum products in Uganda are as high as 35-40%. However, there is no tax on LPG. Although there is apparent competition in the subsector, including entry of new companies, competition is mainly in the distribution and not in price because the price differentials are quite small. Almost all companies increase prices at the same time and by about the same amount.

All in all, traditional fuels (fuel wood and charcoal) are the predominant source of energy for people's livelihood. The following sections provide data specific to the four targets of the East African Community (EAC) Strategy for scaling up access to modern energy services.

a) Access to Cooking Services

The Uganda National Household Survey (2005/06) reported that biomass contributed 88.3% of the total energy consumed for cooking in Uganda. It provided 97.6% of the energy consumed in rural households, and 79% in the urban households. Table 2 provides a summary of the cooking fuel access and per capita consumption.

Table 2: Energy Access rates

Fuel Type	% Access		Consumption per capita kg/yr
	Rural	Urban	
Fuel wood	89.4	22.9	680
Charcoal	8.2	66.1	21.6
Kerosene	0.8	3.5	1.1
Electricity	0.1	0.8	22
Other (LPG, biogas, saw dust)	1.6	6.8	-

While only 4,486 cubic metres of LPG were sold in 2005, 14,679 kilo tonnes of fuel wood and 613 kilo-tonnes of charcoal were consumed. The consumption per capita of charcoal in the urban areas is estimated at 120 kg/yr. Since charcoal is the major source of energy in the urban areas, charcoal consumption increases at a rate close to the urban growth rate of 7% per annum.

According to WHO, nearly 20,000 deaths are attributable annually to indoor air pollution from solid fuel use which is responsible for 4.9% of Uganda's national burden of disease (2002).

The majority of the households (72.7%) use the three-stone method for cooking. The open charcoal stove is used by 14.8% of the households. Only 8.7% of the households use improved stoves. Based on an estimated population of 27.2 million distributed among 4.3 million households in the rural areas and 910,000 households in the urban areas, Table 3 shows a breakdown of the current methods of cooking in Ugandan households.

Table 3: Current Status of Access to cooking services

Category	Traditional practices	Improved Stoves	LPG, biogas, Kerosene & Electricity	Total
Rural	3,626,000	250,000	4,000	3,880,000
Urban	820,000	30,000	60,000	910,000

It is important to note that a sizeable proportion (200,000 units) of the improved stoves was disseminated by the GTZ-supported Energy Advisory Project in the

Ministry of Energy and Mineral Development in the last two years. The project covered only three of the 80 districts of Uganda – illustrating that the scale up of the technologies is possible. The EAC target gap thus stands at about 2.1 million households.

b) Access to reliable electricity for urban and peri-urban poor

Electrification access in Uganda stands at approximately 11% nationally and 4% in rural areas. In the urban areas, only 41.2 % of the population uses electricity for lighting while 54.6% uses paraffin. Table 4 provides electricity connection data.

Table 4: Electricity connection data

	National Grid	Central	Western	Eastern	Northern	Northwestern
Estimated No. of Connections	293,000	211,000	34,000	38,000	8000	2500
Access at District Hqtrs (%)	-	100	82%	82%	26%	50%
Domestics Tariff	0.25	0.25	0.25	0.25	0.25	0.16
Cost per connection (no pole)	\$200	\$200	\$200	\$200	\$200	\$145
Cost per connection (one pole)	\$250	\$250	\$250	\$250	\$250	\$1000
Connection rates	10,000 p.a.	-	-	-	-	480 p.a.

The grid coverage is shown in Figure 1.

A total of 295,830 consumers were connected to the grid in 2006. Of these, 291,724 were domestic and commercial consumers, 966 were industries and 3,140 were street lights.

With an urbanization rate of 7% per annum and an electrification rate of 7% per annum, it means that electricity coverage in the urban areas just matches the urbanization rate.

It is important to note that according to current statistics, urban areas in Uganda are defined by legislation. That is, only those areas gazetted by Government as Town Councils and Municipalities are defined as urban. Many centers of trade and other economic activities such as fishing landing sites, trading centers, camps for Internally Displaced Persons, some very densely populated, are not considered urban unless they are located in an area already designated as urban. Their energy access challenges are principally urban.

In summary the urban situation is as shown in Table 5.

Table 5: Current Status of Energy use in Urban Areas

Category	Lighting with	Lighting with	Electricity	Other	Total
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	Kerosene wick	Kerosene lantern			
Urban	284,000	213,000	375,000	38,000	910,000

Figure 1: Uganda's Electricity Distribution Network



c) Access to modern energy services for all schools, clinics, hospitals and community centres

The majority of Uganda's population, some 87%, lives in the rural areas. To provide social services to this group government, NGOs and individuals have established many schools, health centres and community centres in the rural areas. Access to electricity and other modern energy services in the rural areas is as low as 4% which means that the level of access of the above institutions in the rural areas is equally low.

The most recent information on energy access in health facilities was obtained as part of the baseline study in the Energy for Rural Transformation [ERT] Program – Health Component. The component is specifically aimed at improving rural health service delivery, by providing access to energy through the use of the private sector to install and maintain energy equipment in Health Centres (HCs). The study found that 52% of all the HCs did not have access to either grid, solar or generator power; 37% had access to solar, 7% were connected to the grid and 4% had access to generator power.

The level of health services provided at the health centres is based on a grading of centres into two, three and four as shown in Table 6.

Table 6: Classification of Health Centres (Ministry of Health)

	HC II	HC III	HC IV
1. Staffing	One enrolled nurse	Midwife	Midwife Medical Officer
2. Health Services (Some services might require energy before they can be carried out)	<ul style="list-style-type: none"> - Preventive & Promotive care - Out-patient curative service - Out-reach care 	<ul style="list-style-type: none"> - Preventive & Promotive care - Out-patient curative service - Maternity - In-patient - Laboratory 	<ul style="list-style-type: none"> - Preventive & Promotive care - Out-patient curative service - Maternity - In-patient - Laboratory - emergency surgery
3. Physical facilities (status of facilities included in the assessment)	<ul style="list-style-type: none"> - Out-patient Department - Staff houses 	<ul style="list-style-type: none"> - Out-patient Department - Laboratory - Ward - Delivery room 	<ul style="list-style-type: none"> - Out-patient Department - Dental unit - Laboratory - Treatment room - Operating room - General Ward - Maternity ward

Based on the level of service, the energy sources are as shown in Table 7.

Table 7: Energy Access in Health Centres (Ministry of health)

Level of Access	HCIV	HCIII	HCII	Overall
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No Access	20%	38%	80%	52%
Solar	64%	52%	19%	37%
Grid	16%	10%	1%	7%
Generator*	20%	6%	0%	4%

* Generators were used as backup power for solar and grid energy during power interruptions.

On a national perspective, the Ministry of Health in 2006 carried out a health facilities inventory. If the percentages from the 12 districts are used on the national data to extrapolate to the rest of the country, the figures in Table 7 are obtained.

Table 8: Estimated Energy Access in Health Centres

Level of Access	HCIV	HCIII	HCII	Number of Units
No Access	33	363	1607	2003
Solar	104	497	381	982
Grid	26	96	20	142

Regarding modern energy access in schools and community centres, attempts to obtain data were unsuccessful. Access to the school statistical database available at the Ministry of Education and Sports (MOES) after a school census carried out early in 2007 did not reveal energy access information, although it had been included in the questionnaire. Table 9 shows the distribution of primary and secondary schools in the country.

Table 9: Distribution of Primary and Secondary Schools in Uganda

Type	Urban	Peri-Urban	Rural	Unknown	Total
Primary	1134	2116	12185	2239	17674
Secondary	475	938	1631	1179	4223

If an electricity access rate of 42% for urban, 11% for peri-urban and 4% for rural is used, Table 9 gives an estimate of schools with access to electricity. The balance may be taken not to have access.

Table 10: Primary and Secondary Schools with Access to Electricity in Uganda

Type	Urban	Peri-Urban	Rural	Total
Primary - Access	476	232	243	951
Primary - No Access	658	1884	11942	14484
Secondary - Access	199	103	32	334
Secondary - No Access	276	835	1599	2710

An important point regarding energy services needs of health centres and schools was raised by a number of stakeholders during the study. These

institutions need heating energy services more critically and in many cases in large amounts. Whereas several efforts have been made to provide electricity to these institutions, the heating services have however received less attention. Where this has been addressed, the benefits have been described as tremendous. It is thus important to include their needs in Target 1 above, as a special category, because improved cooking services could enable them realize fairly large savings and better levels of service delivery.

d) Access to mechanical power within the community for productive use and heating for all communities

The concept of a community is not well defined in the Ugandan context where the population lives in widely scattered homesteads. For administrative purposes, however, the smallest unit used is a village. There are 44,402 such villages in the country. Several villages are then grouped into the next level, called a parish. There are 5,225 parishes. For purposes of this study, it is suggested that a parish be defined as a community.

There are many productive uses of mechanical energy in communities. The key ones are the following:

- agro-processing (milling, coffee processing, tea processing, jaggery milling, rice hulling, ground nut shelling, ground nut milling)
- water pumping for domestic consumption, animals and irrigation instead of hand water pumping or trekking long distances with their animals
- saw milling especially on private land in stead of pit sawing
- mechanical fabrication and repair work especially welding and machining
- wood work

Based on the national coverage, very few communities have modern energy services because many of them are very remote. Access to energy for productive use is thus very low. Of these activities, agro-processing is the most wide spread. In areas not connected to the grid, the power source is usually a diesel engine.

It was not possible to establish the number of diesel engines in use in the country during this study as no statistics of that nature was available. It was not also possible to establish how many communities have access to a motive power source. With an 11% electricity access rate the current access may be taken as 522, leaving a gap of 4,703.

1.2 Institutional Framework

The institutional framework for energy access is made up of institutions within Central Government, Local Governments, civil society, the private sector and international agencies. Some of the key institutions are reviewed briefly below:

1.2.1 Central Government Ministries and Departments

Within the Central Government, several ministries are mandated to carry out strategic planning, coordination, policy, quality assurance and technical back-up including support to the private sector and NGOs.

a) Ministry of Energy and Mineral Development

The Ministry of Energy and Mineral Development is the lead Government body responsible for policy development, guidance and implementation in the energy sector. The Ministry of Energy and Mineral Development consists of four technical departments under one Directorate and Support Services. The technical department in charge of energy is Energy Resources Department which is headed by a Commissioner.

Recently, an Energy and Mineral Development Sector Working Group has been formed to primarily coordinate the other relevant Ministries and Institutions to participate in the sector framework.

b) Ministry of Finance, Planning and Economic Development (MFPED)

Overall macro-economic management and development planning is undertaken by MFPED. The Ministry is responsible for resource mobilization and is the node for initiating budgetary allocation to other institutions of Government.

c) Ministry of Local Government

The Ministry of Local Government is mandated to establish, develop and facilitate the management of self-sustaining efficient and decentralized government systems capable of delivering the required services to the people.

d) Ministry of Health

Through its network of healthcare providers, community health workers, etc. the Ministry of Health provides an excellent means of raising awareness about the need to promote cleaner energy services among households, in particular women and children.

e) Other Government Ministries and Departments

Other Government ministries involved in the provision of renewable energy technologies for social services are the, Ministry of Education and Sports, Ministry of Water and Environment, Ministry of Agriculture, Animal Industries and Fisheries.

In the Ministry of Water and Environment, The Directorate of Water Development (DWD) is responsible for issuing permits for water extraction for hydropower schemes as well as provision of water to the rural and the small urban centres not covered by the national water utility, National Water and Sewerage Corporation.

1.2.2 Local Governments.

Local Governments (including district authorities, cities, municipalities and lower level Governments) have been charged under the Local Government Act 1997 with the implementation of decentralized functions. Planning, implementation, monitoring and accountability on the use of resources are now undertaken at Local Government levels. Back up support, policy, guidelines and standards are provided by the Centre.

Each local government is led by an elected Chairperson and an executive. Several committees handle policy matters. The execution is handled by civil servants. There are currently no energy committees or civil servants responsible for energy access issues at these levels. In terms of numbers, Uganda has one city, 79 districts, 5 city divisions, 37 municipalities, 958 sub counties and 83 town councils that are considered local governments.

Local Governments coordinate and monitor the activities of other players such as the CSOs, traditional institutions, private sector and communities within their areas of jurisdiction. The important and single most crucial concern to date is the continued lack of capacity at this level to undertake these tasks.

1.2.3 Statutory Agencies and Public Institutions

Uganda has several statutory agencies responsible for specific activities involved in energy access. The majority are in the provision of electricity. These are presented below.

a) Rural Electrification Agency

The Rural Electrification Agency (REA) was established as a semi- autonomous Agency by the Minister of Energy and Mineral Development through Statutory Instrument 2001 No. 75, to operationalise Government's rural electrification function. It functions as the Secretariat of the Rural Electrification Board (REB) which carries out the Minister's rural electrification responsibilities, as defined in the Electricity Act of 1999. It became operational in 2003.

The Rural Electrification Agency (REA) is mandated to facilitate the Government's goal of achieving a rural electrification rate of at-least 10% by the year 2012 from 1% at the beginning of the decade. This was equivalent to

access by 400,000 households. However, only about 30,000 connections have been achieved to date.

b) Electricity Regulatory Authority

The Electricity Regulatory Authority (ERA) was established in 2000 as an independent regulator of the electricity industry in Uganda as required in the Electricity Act, 1999. The authority consists of five members appointed by the minister responsible for energy with the approval of Cabinet. The minister also designates the Chairperson of the authority.

The authority makes regulations relating to electricity generation, transmission, distribution and utilization including license fees, permits as well as grid, service and safety codes. In addition, the Authority has established a tariff structure, investigated and approved tariff charges. Recently, it rejected a request to increase consumer charges by about 20% on the grounds that Government was already subsidizing the tariff and that the operator ought reduce losses rather than recover costs from consumers.

c) Uganda Electricity Transmission Company Limited

Uganda Electricity Transmission Company Limited (UETCL) is a public limited liability company incorporated under the Companies Act. It was established and commenced operations on 26th March 2001 as a result of the power sector reform and liberalization policy of the Government of Uganda that unbundled Uganda Electricity Board (UEB) into a number of successor companies. It is currently licensed to operate the High Voltage Transmission Grid (above 33 KV), as the System Operator, as the bulk power purchaser and supplier, and to export and import power.

d) Uganda Electricity Generation Company Limited

Uganda Electricity Generation Company Limited (UEGCL) is a public limited liability company incorporated in March 2001 as one of the UEB successor companies. It was mandated to own the two major hydro-power plants at Nalubaale (180 MW) and Kiira (200 MW). UEGCL concessioned out the Electricity Generation Complex to a concessionaire, Eskom Uganda Limited, for 20 years effective April 2003 with UEGCL's mandate changed from operation and maintenance of the complex to mainly monitoring the concession and construction of electricity power plants.

e) Uganda Electricity Distribution Company Ltd

Uganda Electricity Distribution Co. Ltd (UEDCL) is a public limited liability company incorporated in March 2001 as one of the UEB successor companies

for distribution. UEDCL was empowered to trade and supply electricity at 33kV. UEDCL has since concessioned the distribution network and service to Umeme Ltd., a Consortium of Globeleq and Eskom Enterprises to last 20 years.

f) Other Statutory Agencies

There are a number of other agencies that have a role to play in the energy sector. The Uganda National Bureau of Standards (UNBS) is responsible for developing and monitoring standards. The National Environment Management Authority (NEMA) is responsible for regulating the impact of investments on the environment, through instruments like environment impact assessment (EIA). The Uganda Investment Authority (UIA) provides both foreign and local investors with licenses for investment. The National Forestry Authority is in charge of the Central Reserve Forests and the development of the national forest estate including privately owned forests.

1.2.4 Development Partners

Uganda has received substantial external support for the provision of energy services, particularly from the time of the power sector reforms introduced in 1999. Several agencies are presently active in the sector in the provision of finance and other services through various programmes. The key ones are:

- **GTZ** – has been supporting the MEMD since June 1999 in a number of areas principally through the Energy Advisory Project (EAP) that provides policy advisory services and direct implementation of projects in energy access, renewable energy and energy efficiency projects. It has disseminated 270,000 improved cooking stoves 80% of Bushenyi and Rakai districts in Uganda and is scaling up to include the six districts of Kabale, Mukono, Wakiso, Tororo, Kayunga and Kamuli. It has also worked with the district of Masindi to develop and implement a charcoal sustainable production and distribution strategy. It has mobilised some 9 million euros for continuation of this work in the coming three years.
- **World Bank** – one of the major development partners in Uganda and currently supports projects in Utility Sector Reform, Power Investment, the Bujagali Project and together with GEF funds the Energy for Rural Transformation programme
- **Sida** – funds several grid extension projects to service five remote districts of Uganda.
- **AfDB** – is contributing investment capital for power plant and electricity transmission lines as well as supports improvement of health facilities through the upgrading of facilities.
- **UNDP** – supports programmes specifically targeting increasing energy access for the poor, mainstreaming energy in the planning process and multifunctional platform, mini hydro and solar projects.

- **WHO** – offers expertise and technical support linked to household energy, indoor air pollution and health.

1.2.5 The Private Sector

There is a significant presence of the private sector in the majority of the sub-sectors under energy. These range from suppliers of equipment, electricity generation, stove manufacturers, charcoal traders, transporters and expert consultancy and support services. In addition, the private sector provides a source of investment and resource mobilization to the sector.

Another set of private sector players, relevant in access to modern energy services, are the petroleum companies that are marketing LPG. In Uganda, four of these are active, namely: Shell, Total, Chevron (formerly Caltex) and Kobil. These provide LPG packages in small household-size cylinders, except Shell that also sells in bulk mainly to institutions like hotels and universities.

To coordinate several projects such business development finance, capacity building and advocacy with Government an umbrella organization called Private Sector Foundation Uganda (PSFU) has been formed. It is currently running several energy projects supported by the ERT programmes.

1.2.6 The Civil Society (NGOS/CBOs/ROs/COs)

Participation by CSOs in the activities of the energy sector has been evolving with the reforms in the sector. Their involvement is varied and ranging from mobilization to actual implementation of activities in some of the districts. At the national level NGO such as IRDI, JEEP, UREA, NGO Forum, Ecotrust and DENIVA represent the picture and kind of involvement of Uganda NGOs in the sector. Several of these are directly involved in capacity building as well as implementation of energy access projects in the community. Examples have included dissemination of improved stoves and development of the charcoal strategy.

Another NGO in the energy sector is the Energy Institute of Uganda (EIU). EIU is a professional non-profit making body that provides a forum for advancing knowledge on petroleum, gas, power, solar, and other forms of energy in Uganda. Founded in 2004, its major activities include: capacity building, advocacy, database services and raising awareness.

1.2.6 Local Communities

Community participation and collaboration in the provision of energy services has been low. It is only on the coming of the Rural Electrification Agency that a clear role of communities has been defined.

1.3 Policies

The Energy Policy for Uganda was promulgated in September 2002 soon after the Power Sector Reform and Privatization Strategy of 1999 and enactment of the electricity law (Electrify Act 1999). The policy itself had a vision for increased and improved modern energy supply for sustainable economic development as well as improving the quality of life of the Ugandan population. It set a long-term planning approach for energy development and introduced the general Government macroeconomic policy of liberalisation into the energy sector by putting in place clear, long-term policy guidelines to encourage project development and harmonise sector activities. In this context the energy policy guided the various institutions to support private sector growth.

The Energy Policy for Uganda also tackled the petroleum, new and renewable energy and the atomic energy subsectors. Some of the policy objectives pertinent to the EAC targets are:

- To establish the availability, potential and demand of the various energy resources in the country
- To increase access to modern affordable and reliable energy services as a contribution to poverty eradication
- To improve energy governance and administration
- To apply the economic regulation to the power sub-sector and competition regulation to the petroleum supply sub-sector.
- To provide affordable energy services for households and community based services including water supply and sanitation, health, education, public lighting and communication in order to improve the social welfare of the rural population.

In March 2007, the Government of Uganda approved a new Renewable Energy Policy formulated to reinforce the Energy Policy of 2002. The overall objective of the Renewable Energy Policy is stated as to diversify the energy supply sources and technologies in the country. In particular, the policy goal is to increase the use of modern renewable energy from the current 4% to 61% of the total energy consumption by the year 2017. It addresses a number of the principal areas of concern to the EAC targets; namely:

- Promoting small renewable energy power investment
- Encouraging investment in solar energy technologies
- Facilitating development and production of bio fuels
- Providing incentives for the growing of energy crops, efficient use of wood fuel, charcoal stoves and biogas in households, institutions and industries

- Sustaining the development of renewable energy and technologies through several policy measures such as acquisition and dissemination of technical data and availing the data and general information to the public, creating a Renewable Energy Department and an Energy Efficiency and Conservation Department in the Ministry of Energy and Mineral Development, establishing a National Energy Committee at the National Level and District Energy Committees and District Energy Offices at the Local Governments, and institutional building

The Uganda Forestry Policy (2001) is the key policy instrument, apart from the Renewable Energy Policy (2007), which is relevant to Target 1. It points out that forest cover in Uganda is fast diminishing, the shrinking rate being estimated at 55,000 ha per year or 2%. It further points out that 70% of the 4.9 million hectares of Uganda's forest coverage is mainly woodland that grows on private or customary lands with no or limited regulation and management. Moreover it is experiencing very high rates of clearance for agriculture and charcoal production.

The Forestry policy assigns the responsibility of developing and implementing strategies for biomass energy conservation, focusing on households, charcoal producers and industrial consumers to the MEMD. Thus, the Forestry Policy itself does not set out any particular structures or strategies for developing and regulating the harvesting of forest cover for fuel wood and the conversion to charcoal. It is silent on this issue which is of particular relevance to Target 1.

1.4 Financing Mechanisms

Currently, energy access is financed within the Government's Poverty Eradication Action Plan (PEAP) which is Uganda's Poverty Reduction Strategy Paper (PRSP). There are several avenues government channels funding to the energy sector.

- Energy Fund which is a budgetary provision by the Government of Uganda as investment capital for construction of large hydropower and emergency thermal power generation plants amounting to US\$55m in 2007/08
- Rural Electrification Fund (REF) established under the Rural Electrification Strategy and Plan (2001) and administered by the Rural Electrification Board (REB) and implemented by the Rural Electrification Agency (REA). REA uses a demand – driven approach in that any capable sponsor such as private company, NGOs, local authorities and communities can initiate electrification projects. For areas which would not be attractive for the private sector and public – private – partnership; the financing avenue is by subsidy provision. The REF is funded through:
 - appropriation of Parliament
 - 5% levy on bulk purchases of electricity from generation

- Loans and grants from development partners.
- **Private Sector** - The Central Government has mobilized substantial private investment in the large power sub-sector particularly the establishment of power generation plant – diesel plant, HFO plant, hydropower plant.
- **Development Partners** - There is substantial financing from development partners. Of particular significance is the World Bank/GEF ERT \$400 million and the GTZ- funded EAP that has funded the dissemination of improved cooking stoves in the rural districts of Uganda and energy efficiency measures.
 - Energy for Rural Transformation Programme under which the Bank of Uganda manages a credit component of US\$6.8 million given to private investors for generating electricity. There is also some US\$3.8m to be lent to MFIs for provision of loans to rural households/enterprises that are in need of acquiring/purchasing solar equipment in their homestead.
- For rural financial services, there is a sub-county Development Strategy that assists the micro-finance sector in rural and urban areas by supporting the establishment, strengthening, expansion and consolidation of both MFIs and SACCOs. These are to provide the credit lines to households and cooperatives.

1.5 Codes and Standards

There are several codes and standards that apply to the EAC targets. These should cover both devices and practices. The relevant ones are outlined below.

- ICS – Nationally the Lorena rocket stove is being promoted as the device of choice for fuel wood and the ceramic *jiko* for charcoal. There are however no standard designs or codes on their manufacture. There is also no licensing system for the contractors and/or manufacturers of these devices. However, through training conducted by the EAP and MEMD some aspects of standardization are being promoted
- LPG – There are no specific standards applicable. Each of the four distributors uses their own cylinder brand. Some standardization occurs in the regulators which are able to fit into any cylinder. The sizes, in terms of the weight of the different cylinders are also standardized into 6 kg, 10 kg, etc.
- Electric wiring of houses is regulated by national wiring codes. Artisans who carry out this work are expected to be licensed by ERA. This applies to the high income and expensive housing but not to the low income and rural areas.

- Solar PV systems have received attention from the Uganda National Bureau of Standards and MEMD after experiencing aspects of dumping of low grade systems

2.0 SWOT Analysis

As part of the study, a Strength, Weakness, Opportunities and Threats (SWOT) analysis of the country's current institutional and policy situation and programs promoting energy access was carried out. The focus of the analysis remained within the four targets in the EAC Strategy. The following sections present the analysis with respect to the four (4) targets.

2.1 Target 1: Access to modern cooking devices and practices

<p>Strengths</p> <ul style="list-style-type: none"> - Favourable climate and other conditions for the production and regeneration of biomass - Division of N&RSE in the Ministry of Energy and Mineral Development with specific mandate to handle household energy issues and is to be upgraded to a department as per the Renewable Energy Policy 2007 - Existence of private sector initiatives in the provision of improved cooking devices - Capacity gained through the EAP for scale up dissemination of improved cooking stoves - Well developed policy in the Ministry responsible for Energy, Renewable Energy Policy 2007 which has specific targets, plans, activities regarding improvement of cooking devices and practices - The technology in terms of proven improved cooking stoves exists 	<p>Weaknesses</p> <ul style="list-style-type: none"> - Inadequate skilled manpower in making and distributing improved devices particularly in the rural areas - Poor infrastructure at household levels especially lack of kitchens in homesteads - Lack of strong NGOs to effect the necessary interventions or mobilize the local communities - Inadequate availability and dissemination of data on resource availability, its impact and the interventions required - Lack of appropriate policy and regulatory framework governing the use of biomass resources especially those on private lands - Lack of a strong enough focus on fuel wood resources in the forestry policy - Neglect of cooking services by Government because of spending the bulk of the resources in the large scale power sector, mainly electricity - Lack of appropriate mechanisms such as bye-laws to effect and enforce good practice as it is considered interference by Government in domestic affairs such as cooking practices - Insufficient funding for programme activities - Poor attitudes especially with regard to cooking usually attributed to entrenched cultural practices such cooking certain foods for long hours - Inadequate knowledge among the people on effect of exposure to kitchen smoke - Cultural prescription that women and children have the responsibility to cook and yet they have less authority to change these conditions
<p>Opportunities</p> <ul style="list-style-type: none"> - Diminishing fuel wood resources with half the districts of Uganda experiencing fuel wood deficiency - Conducive policies for the private sector - Large consumer base that provides large potential market - Increasing enrollment at village and local schools that provides an avenue to pass on the required skills - Eager and enthusiastic private sector that is willing to take up opportunities when provided - Potential petroleum resources which may lead to increased availability of LPG - Potential funding from development partners willing to support eradication of poverty - Specific development programmes such as ERT with energy as their focus proving that well defined programme objectives can be achieved - cooperation between Ministry of Energy and Ministry of Health to leverage programmatic actions on household energy and health especially regarding awareness raising through the health sector and capacity building 	<p>Threats</p> <ul style="list-style-type: none"> - Increasing population and demand for agricultural land which is putting pressure on land, causing clearance of forest and woodlots for agriculture - Shift to plantation forestry that makes it difficult for poor people to access originally communal woodlots - Lack of appreciation of the link between energy access and other sectors such as health, environment and natural resources - High cost of modern cooking devices - Poor maintenance culture leading to shorter life of devices - Persistent poverty and therefore lack of purchasing power - The budget system of ceilings that crowds out some funds meant for sections that may not be considered of high priority by Government - Continued conflict making some areas difficult to reach, work with or jut unstable for any meaningful interventions to take root and show impact

<ul style="list-style-type: none"> - Interventions are highly cost-beneficial: a GTZ-run improved stoves programme in Uganda shows a 25-fold return on investment 	
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In general, Uganda has considerable energy resources, especially biomass, which is the predominant fuel for this target. In addition, Uganda has a favourable climate for biomass regeneration and growth. However, pressure from increased use as fuel wood, agricultural land clearing and other requirements have contributed to the severe loss of forest cover. Nearly half the districts now have a biomass deficit. Moreover most of the biomass is used in very inefficient technologies. On the other hand, several initiatives to conserve biomass resources undertaken by Government and the private sector, including NGOs, have started to have an impact and could be further supported as a scale up exercise.

One such alternative is the use of LPG which despite initial investment costs can result in a 7-fold return on investment according to a WHO study. Unfortunately, Uganda currently imports all petroleum requirements. This introduces several constraints to the adoption of LPG as cooking fuel. The cost of transporting it is high since Uganda is landlocked. Its availability is also constrained to the major urban centres where the multi-national petroleum companies operate. The recent discovery of commercially exploitable petroleum resources may provide an opportunity for Uganda to expand the use of LPG.

Discussions with various stakeholders during this study indicated that low institution capacity is a major weakness to the development and uptake of energy services in Uganda. Although there are capacity limitations at all levels, it is especially critical at the household energy access levels. At the top level, there is limited technical capacity for strategic planning for the sector, to coordinate the activities of the various players and to offer technical guidance to other stakeholders regarding energy access issues.

At the local levels, there are no institutional structures to initiate, develop, promote and implement energy access projects at the district, municipality and village levels. In the rural areas, there are basically no personnel involved in energy access issues. Moreover, lack of awareness and the relevant skills by public actors to address energy and related issues hinders increased participation. Under a decentralized system in which public needs are handled, this deficiency puts many areas at a disadvantage.

Uganda has adequate policy and legal instruments to handle energy access issues. In the household energy subsector however, the picture is not so good. There is indiscriminate clearing of woodland, especially on private land. The charcoal business in most areas is unregulated and untaxed. This has led many areas to experience uncontrolled destruction of forest cover and to shift from surplus to deficit areas. The main problem has been lack of capacity at the local level to develop programs to organise the sector, develop appropriate programmes and to monitor their implementation.

The experience of the GTZ-funded Energy Advisor Project in disseminating improved cook stoves and in the development and operation of a strategy for sustainable charcoal production and licensing systems is a major strength in the country.

Finance is a major constraint to energy access at almost all levels and will impact heavily on meeting of the EAC targets. Regarding Target 1, the households need to meet the upfront costs associated with changing to modern fuels. Whether it is an improved stove or an LPG stove, most households experience serious difficulty in raising the necessary funds. Except for the project support referred to above, there are few schemes that promote or enable households to switch to modern cooking devices or practices.

2.2 Target 2: Access to reliable electricity for all urban and peri-urban poor

Strengths	Weaknesses
<ul style="list-style-type: none"> - Widely available renewable energy resources such as mini hydro and solar - Well developed policy in the Ministry responsible for Energy, Renewable Energy Policy 2007, that has specific targets, plans, activities regarding improvement of cooking devices and practices - The Decentralised system of governance that allows local communities to lobby and initiate different projects for their areas - Experience gained from the ERT programme in mainstreaming energy into other service sectors - Division of N&RE in the Ministry of Energy and Mineral Development with specific mandate to handle the exploitation of renewable energy resources - Strong private sector participation - Favourable institutional framework in form of ERA, REA, REF and REB 	<ul style="list-style-type: none"> - Poor energy consumption practices making it necessary to increase capacity for generation - Poor maintenance culture leading to frequent breakdowns and low reliability - Limited capacity especially with respect to grid electricity - Poor practices especially with regard to cooking such as overcooking - Uneven coverage of the national grid - Low load among the majority of the customers - Dispersed nature of settlements making it difficult to extend the national grid to the rural areas - Unplanned housing infrastructure which makes electrification difficult - Low capacity of the private sector to implement projects - Low level of mobilization of the communities to demand, plan and implement better services - Lack of incentives to serve the peri-urban poor - Insufficient funding for programme activities - Long and complicated bureaucracy in procurement

Opportunities	Threats
<ul style="list-style-type: none"> - Growing urban and peri-urban population that is a potential market - Abundance of renewable sources of energy such as solar, hydropower - Relatively high density of settlements in some areas - Most urban dwellers are able to pay for services - Availability of funding from development partners - Efficient private companies that are able to supply improved devices and service like LPG 	<ul style="list-style-type: none"> - Dumping of low grade devices - Return of development partner finances due to failure to consume - Long project implementation and payback periods that discourages investors - Bias of private investors to short term, quick return investments - Low levels of income making purchasing power low - Higher costs of improved devices and services - High interest rates that discourage lending

Uganda has a large potential to be exploited to increase availability of cost-effective electricity. Large-scale hydropower potential along the River Nile has been estimated at about 2,000 MW including some six potential major hydropower sites. The Bujagali site (250 MW) is currently under construction while the Karuma site has also been significantly studied and is to be developed in the medium term.

Uganda also has more than 60 mini hydropower sites with a total potential of about 210 MW. These are spread in several places in the country and provide a good opportunity to provide cost effective electricity using mini grids or to feed into the national grid.

The lack of sufficient generation capacity is a major constraint to increased access to electricity in the urban as well as rural areas. Attempts to expand the coverage through grid extension have not attracted as much investment as was expected. Uganda's electricity generation capacity from hydro power is 380 MW most of which is generated from dams on the Nile River. This has recently been reduced by 165 MW due to reduced water levels of Lake Victoria which worsened the deficit. To offset the deficit, thermal generation has been adopted. Some 100 MW is currently generated by this means. However the cost of thermal electricity is much higher necessitating Government to subsidize the tariff.

The major capacity weakness for achieving this target is in planning for electrification, in its implementation and its maintenance. The current policy environment requires strong private sector participation. Recent experience in expanding both generation capacity as well as distribution has shown that the private sector cannot mobilize sufficient funding and is not ready to meet the level of risk required by this strategy. Government has had to intervene through project support, guarantees and various subsidies. This is a clear recognition that the investment requirements of the sector cannot be met using the provision of a

conducive environment by Government while the private sector implements the projects.

Uganda has adequate policy and legal instruments to handle rural and urban electrification issues. Notable among these are the Electricity Act 1999, the Energy Policy 2002 and the Renewable Energy Policy 2007. The regulatory framework for electricity generation, transmission and distribution has received a lot of attention in the past few years. ERA, the regulator is fully operational and has issued several codes, regulations and other instruments under its mandate. This has enabled the stakeholders in the sector to operate in a secure and orderly environment. In addition, Uganda has an active institutional framework for rural electrification in form of REF, REB and the REA. Overall, the electricity reform has been consolidated. Today, generation is effectively handled by private sector players. Although the same applies to distribution, effective electricity service delivery is still a major challenge, especially with regard to actual connections and affordability.

An opportunity that exists in the sector is the availability of financial support from development partners. Many institutions such as GTZ, KfW, the World Bank, EU and a number of bilateral donors are willing and have put sizeable sums of money into the electricity sub-sector. This means that in a number of cases it is the lack of institutional and human capacity that has been the problem.

The lack of financial mechanisms for scaling up rural and urban electrification is a major weakness. The major constraint is the electricity connection fees. Discussions with persons involved in grid extension revealed that many grid extensions have not realised the envisaged connection rates because of the connection fees charged. While projects such as ERT or grants can extend the distribution network to an area, the final connection has been left to the households. This has proved a challenge in many areas where these schemes have been implemented. Many households are simply not able to pay the US\$200 required to connect them to the national grid. Isolated power grids and devices are even more expensive and out of reach of the majority.

2.3 Target 3: Access to modern energy services for all schools, clinics, hospitals and community centres

<p>Strengths</p> <ul style="list-style-type: none"> - Well developed policy in the Ministry responsible for Energy, Renewable Energy Policy 2007 that recognizes the need to address the energy needs of these institutions and sets some specific targets, plans, activities regarding improvement of cooking devices and practices - The Decentralised system of governance that allows bottom up programme development and planning - Experience gained from the ERT programme in mainstreaming energy into other service sectors - Division of N&RE in the Ministry of Energy and Mineral Development with specific mandate to handle the needs of such institutions - Favourable institutional framework in form of ERA, REA, REF and REB 	<p>Weaknesses</p> <ul style="list-style-type: none"> - Failure to integrate energy services in the infrastructure plans of many of the institutions such as during building of schools and health centres - Limited capacity especially with respect to grid electricity - Insufficient funding for programme activities - Low reliability of supply especially electricity - Isolated nature of facilities with limited numbers of ordinary domestic or commercial customers/consumers to overcome installation costs - Lack of suitable infrastructure to take on the additional energy access facilities - Poor design or failure to include energy access facilities during design and construction of physical facilities - Low capacity of the private sector to implement projects - Low level of mobilization of the communities to demand, plan and implement better services - Lack of incentives to serve such public institutions - Lack of personnel at these institutions to handle aspects of planning, set up and implementation of the energy facilities - Poor reliability of equipment installed especially solar systems - Insecure financial base, which limits steady availability of funding and ability to pay for the required services - Energy services are given a peripheral status within the budgets of these institutions
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<p>Opportunities</p> <ul style="list-style-type: none"> - Growing population that is leading to increased enrolment, larger facilities and more facilities - Abundance of renewable sources of energy such as solar, hydropower - Relatively strong demand for the services - Several of these facilities are in one location and most in fast urbanizing areas thus there potential to pay for services - Strong Government policies towards social service provision - Availability of funding from development partners since education and health are considered priority social sector services High priority level given to the social sector (health and education) within the Poverty Eradication Action Plan - 	<p>Threats</p> <ul style="list-style-type: none"> - Low budget allocation especially recurrent budgets making it difficult for these institutions to pay for services - High costs of devices and services - Lack of technical capacity at this level to plan, implement and maintain facilities for energy supply
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Several of the strengths, weaknesses, opportunities and threats described in Target 2 above apply to this target as well. A few however are specific to the nature of these institutions.

The major weakness is the approach used in the planning of these facilities. Many plans do not adequately take into account the inclusion of electricity provision. In addition energy services are given a peripheral status. As public institutions, their budgets are inadequate and their human capacities are often restricted to the professional staff that carries out the core activities of the institutions.

It is important to note that current national policy, especially PEAP, places the social sector as a priority. The Universal Primary Education and the Universal Secondary Education as examples have meant increased enrolment in schools necessitating increased investment in infrastructure. The problem has been that because of low levels of awareness, energy services are not mainstreamed into the planning of such facilities.

The same applies to the health sector. Government with the support of development partners has been making resources available for the construction of health centres. The problem has been that energy services are rarely integrated into these programmes. Energy services often come in as an afterthought. Yet if integrated, the additional cost would be quite small. Good experience from the ERT health and education sector components has been gained that can be used in the scaling up of energy access in the health and education sector institutions.

2.4 Target 4: Access to mechanical power within the community for productive use and heating for all communities

<p>Strengths</p> <ul style="list-style-type: none"> - Well developed policy in the Ministry responsible for Energy, Renewable Energy Policy 2007, that seeks to address the needs of business enterprises and sets some specific targets, plans, activities regarding provision of power for productive purposes - Programmes such as PMA that specifically target agricultural enterprises - Experience gained from the ERT programme in mainstreaming energy into other service sectors - Strong private sector participation - Favourable institutional framework in form of ERA, REA, REF and REB 	<p>Weaknesses</p> <ul style="list-style-type: none"> - Poor energy consumption practices in industry making it expensive and requiring extra capacity - Limited capacity especially with respect to grid electricity - Insufficient funding for equipment and related energy services - Low reliability of supply especially electricity - Low load among the majority of the enterprises - Dispersed nature of settlements and enterprises - Unplanned settlements resulting in higher costs of consolidation of produce - Low capacity of the private sector to implement projects - Low skill levels and lack of awareness on better and improved methods - Lack of long term outlook on investments - Lack of funds for investment - Lack of capacity to write bankable projects - Poor management practices especially with respect to personnel, finances and location - Inability to absorb and dispense credit where available
<p>Opportunities</p> <ul style="list-style-type: none"> - Growing population that is a potential market for all types of goods - Abundance of renewable sources of energy such as solar, hydropower - Lack of viable energy service sources - Most enterprises if managed well are able to pay for services - Availability of funding from development partners - Efficient private companies that are able to supply improved devices and service like LPG - Increased demand for organic agricultural products in the export market 	<p>Threats</p> <ul style="list-style-type: none"> - Low levels of income making purchasing power low - Higher costs of improved devices and services - High interest rates that discourage lending - Dumping of low grade devices - Private sector policy that expects fledgling and weak enterprises to fend for themselves but supports large, well-connected firms to benefit from Government subsidies

A number of the strengths, weaknesses, opportunities and threats described in Target 2 above apply to this target as well. A major weakness is that the provision of mechanical power in the communities has been left to the communities themselves. Private initiatives have shouldered this burden alone. Thus many services addressing this target are inadequate, unreliable or relatively expensive. There are no explicit policies for this target. Although some policies and programmes exist in related sectors such as agriculture, water and trade, there is limited appreciation of the role motive power plays in their development and thus there is lack of integration of the provision of power to facilitate the development of enterprises.

The private sector that is the major player in this target is severely limited in its capacity. The lack of financial capacity within the private sector is a major constraint. The main reason has been failure to raise sufficient capacity to finance investment costs. Not only are the finances limited, but it is also difficult to access credit from financial institutions. Many financial institutions are unable to meet the needs of the private investors in the energy sector, because the investments in the sector require longer periods than the maximum of seven years that is currently the norm. In addition, the interest rates are more than 20% in some cases, which are very high.

3.0 Key Findings

A synthesis of the weaknesses in Section 2 above shows that there are several institutional challenges and needs that have to be addressed to prepare the country for the scale up of modern energy services called for by the EAC strategy. In addition, the strengths and opportunities present areas where interventions can be made to address the challenges and gaps. These are outlined in this section.

3.1 Institutional Challenges and Gaps

The following are the key institutional challenges and gaps:

- i. ***Inadequate Elaboration and Operationalisation of the Legal and Institutional Framework:*** The legal and policy framework that has been formulated has not yet been fully elaborated and operationalized. The Renewable Energy Policy 2007 has several provisions that clearly address the EAC targets. These need to be elaborated to the stakeholders. There is need for a communications strategy to carry out sustained information dissemination and stakeholder sensitization on Government policies and other instruments in the sector.
- ii. ***Limited Integrated Resource Planning:*** There is lack of a comprehensive planning regime incorporating all available resources, technologies, user requirements and financing mechanisms. There is currently no Energy Sector Investment Plan, though there is a Renewable Energy Subsector Investment Plan. In addition, there is limited integration of energy access in other related sectors.
- iii. ***Limited Stakeholder Involvement:*** It has been recognized that the success of any project hinges on high levels of stakeholder participation. For the EAC strategy, and indeed any energy programme for that matter, to succeed, the lacklustre incorporation of stakeholders needs to be addressed.

- iv. **Limited Technical and Institutional Capacity:** There is limited technical and institutional capacity in both the public and private sector to mobilize and manage energy services investments. At the highest levels, the Ministry has very few officers. There is need to review the establishment of the Ministry and raise the level of the energy sub-sector to a directorate and to divide the tasks currently undertaken by one department. Outside the ministry, there are no structures to initiate, develop, promote and implement energy access projects at the district, municipality and village levels.
- v. **Limited Private Sector participation:** There is lack of capacity and inadequate mechanisms to promote private sector participation. There is need to develop capacity of the private sector so that they not only take advantage of the mechanisms in place but also influence the development of new business models that are called for by the EAC strategy.
- vi. **Inappropriate Financing Mechanisms:** The EAC strategy calls for increased access to modern energy services by the people who are least able to afford or to institutions that are ill financed and have limited or no influence on their financial fate. Their access to modern energy services is constrained by a general lack of appropriate financing mechanisms to facilitate the development and promotion of modern energy access. Mechanisms for consumer financing to address this condition are grossly inadequate. There is need for studies to evaluate the different business models that could be relevant to the different target groups.
- vii. **Underdeveloped Market for Modern Energy Services:** The majority of the target beneficiaries are not active in the modern energy services market in the EAC strategy. This makes it unattractive for private investment and limits the scale of operation. There is need to design mechanisms to bring the poor sections of society into the mainstream energy market. The barriers they face need to be identified and ways to address them designed.
- viii. **Lack of Awareness:** There is limited awareness of the importance of modern energy among the stakeholders, and how access to modern energy services can influence and/or change their condition.
- ix. **Lack of Sufficient Data on Resource Base:** There has been limited progress made in many projects that are meant to improve access to modern energy services. One of the major impediments has been the dearth of knowledge about resource availability, their accessibility, and other related information.

3.2 Recommended Actions

The actions outlined below will help overcome several of the constraints above. Through these actions, it is expected that the country will be enhancing what is already taking place and preparing for the implementation of the scale up envisaged in the EAC Modern Energy Access Strategy.

In line with the EAC strategy, these are grouped into the four service lines:

- Mainstreaming Energy Access into National Development Planning and Budgeting
- Developing pro-poor energy policies and regulatory framework
- Strengthen National Capacity to deliver energy services for the poor
- Identifying High Potential Business Models

3.2.1 Mainstreaming Energy Access into National Development Planning and Budgeting:

There are several programmes that are underway which need to be enhanced and/or expedited. These include:

- a) The Energy for Rural Transformation Programme that has established a modality for designing and implementing energy projects across sectors
- b) The Indicative Rural Electrification Master Plan that is being developed.
- c) The recently formed Energy and Mineral Development Sector Working Group and the Energy and Mineral Development Sector Donor Working Group
- d) The on-going review of the PEAP and its transformation into a Five Year National Development Plan

In addition to these, the following actions are also recommended in line with the EAC strategy:

- a) Build up the public profile of the energy sector through elevation of the energy department to a directorate and introduce a department to address rural energy access which has worked effectively in other sectors such as health, education, water, works and local government.
- b) Establish a National Energy Advisory Committee with representatives from stakeholders as indicated in the Renewable Energy Policy 2007.

- c) Establish energy governance structures at the district and LC III levels in form of Energy Committees, energy officers and energy assistants.
- d) Introduce a Sector-Wide Approach (SWAP) in energy planning and implementation.
- e) Ensure that the budget allocations to the energy sector for all stakeholders include mainstreaming of energy access for the poor sections of society
- f) Lobby all national planning entities especially the Ministry of Finance, Planning and Economic Development, the National Planning Authority and the Parliamentary Natural Resources Committee to actively mainstream energy in the national development plans
- g) Sensitize planners about need for allocation of resources to the energy services for the poor and for social sector institutions
- h) Carry out relevant studies on energy resources potential, improvement options, strategies and socio-economic benefits of interventions in energy services for the poor and for social sector institutions
- i) Develop a monitoring and evaluation system to track plans and budgets and their impact

3.2.2 *Developing pro-poor energy policies and regulatory framework:*

The Energy Policy of Uganda 2002 put emphasis on the provision of electricity with rural electrification meant to benefit the poor. The new Renewable Energy Policy 2007 reinforces this approach in that the emphasis is to increase the use of renewable energy resources to overcome some of the rural electrification challenges. In addition, it focuses on the energy services for the poor. This seems to indicate a shift towards supporting a diversity of energy options and service delivery modalities.

In line with the above, there is a need to review and refine the responsiveness of the legal and institutional framework to facilitate programmes, plans and activities of the various stakeholders in pursuance of the targets of the EAC Strategy. The recommended actions are:

- a) Develop appropriate regulations for facilitating community-based energy projects through appropriate pricing, subsidies and taxation with regard to fuel wood, charcoal, grid connections, mini grid development and prioritization of energy access projects of target groups in the EAC strategy , the rural areas, peri-urban poor, schools, health centres, water pumping stations and commercial enterprises
- b) Ensure that the energy governance structures at the district and LC III levels in form of Energy Committees, energy officers and energy assistants at the local levels are established and guided to develop

and enforce policies and bye-laws that enable the proper functioning of stakeholders at the local levels.

- c) Exploit synergies between different policies and programmes to ensure rapid expansion of modern energy services for the poor and underserved areas. Examples of different targeted programmes are PFA, PMA and NUSAF. There is need to ensure that these define and allocate resources to energy access for their beneficiaries or that there are regulations and guidelines for the local communities to seek support for interventions in the energy sector.
- d) Develop specific policies relevant to the energy services for the poor. These include policies for wood supply, charcoal production and their distribution chains.
- e) Develop policies that are conducive to switching to modern energy services especially LPG.
- f) Develop appropriate policies on pricing/subsidies/taxes/duties that affect access to modern energy services to the poor sections of the population targeted by the EAC Strategy.
- g) Provide for stakeholders to initiate new policies, develop policies and lobby on decision makers to adopt and or implement pro-poor policies

3.2.3 Strengthen National Capacity to deliver energy services for the poor:

There is need to develop adequate capacity at the national level to expand access to modern energy services. There is also need to enhance and boost the human resource base at the public and private level. Some of the activities that need to be performed include: strategic planning for energy access, collect and analyse data on resource availability, energy needs and investment requirements, formulation of financing mechanisms and budgets and carry out all or most of the actions recommended in the other strategies.

There is also need to boost capacity at the local level to define and implement rural energy policies and programmes. Most of the planning on energy services has been top-down. There is currently a marked trend towards bottom up planning. Indeed, some of the current energy access projects, such as those of REA, expect initial proposals from the local communities, NGOs, enterprises and once established expect to be run by the private sector. A number of such planned projects have not progressed adequately. The failure is being attributed to the fact that these players do not have the requisite capacity. The capacities of LCs, NGOs and the private sector need to be developed to the level where they can initiate, mobilize and monitor energy access projects.

The recommended actions are:

- a) Increase the staffing as well as institute measures to attract and retain qualified personnel into the sector
- b) Carry out a needs assessment for all the stakeholders in the sector
- c) Institute a fast track capacity building programme for local authorities on energy access issues
- d) Sensitize stakeholders in the public sector, private sector, microfinance institutions, training institutions, NGOs, CBOs on the linkages between energy access to gender, poverty and identify their different roles in promoting the synergies.
- e) Enhance capacity to acquire, process and disseminate data on the energy resource availability, demand requirements and other energy project development data requirements.
- f) Develop and institute mechanisms for dissemination of information on energy access markets.
- g) Develop local capacity to formulate fundable projects

3.2.4 Identifying High Potential Business Models:

The recommendation here is to review and introduce a financing and fiscal policy environment to attract more investments and enable modern energy services to penetrate different markets envisaged by the EAC strategy.

The key recommendations are:-

- a) Develop and implement, through public private partnerships (PPP), innovative financing mechanisms, including targeted subsidies to stimulate the market penetration of modern energy services.
- b) Introduce specific regimes that favour the targets of the strategy including preferential tax treatment, tax exemption and accelerated depreciation.
- c) Develop innovative risk mitigation mechanisms and credit enhancement instruments, to provide comfort to project lenders and developers.
- d) Encourage the inclusion of energy access in projects designed for social service provision in health, water supply and education sectors through grant financing, especially in rural development programmes.
- e) Promote financing schemes adapted to local needs and traditions, such as revolving funds, to enable market development for energy

access such as household improved cook stoves and solar PV systems.

- f) Ensure periodic review of tariffs, taxes on energy devices, interest rates and other fiscal instruments that will promote energy access projects.
- g) Encourage producers, distributors and users to form marketing groups or associations
- h) Encourage large economies of scale programs and big business to participate in the household energy services market

4.0 Draft Activity Implementation Workplan

4.1 Summary Table

The summary of the proposed two-year workplan for Uganda is presented in Table 4.1 while Table 4.2 presents a synthesis of the project outputs. Table 4.3 presents the workplan as a whole.

Table 4.1 Summary of the proposed two-year workplan for Uganda

Target	Main streaming energy access in development planning	Developing pro-poor energy policies & frameworks	Strengthening Capacity to deliver energy services	Identifying business models
1: Access to modern cooking devices and practices	<p>Integrate of modern cooking methods(LPG, ICS) into national, sector and Local Government planning and budgeting</p> <p>Include of access to modern energy services in the investment plan and implementation</p> <p>Include Target 1 issues in the energy sector working group</p> <p>Sensitize of leaders and planners at National, sectoral and district level about needs for modern</p>	<p>Develop and implement incentives for the use of improved cooking services</p> <p>Create standards, codes and regulations on improved stoves, LPG, wood and charcoal production and enforce them</p> <p>Develop and implement mechanisms for implementation of the renewable energy policy</p>	<p>Strengthen the capacities of energy services institutions</p> <ul style="list-style-type: none"> - Establish energy structures at the Local Government - Expose government officials to successful programmes <p>Create energy focal points in different sectors at the National and LG levels</p> <p>Train and support NGOs and private sector companies to manufacture</p>	<p>Carry out studies to identify appropriate business models for each service and promote them accordingly</p> <p>Include energy services into the Terms of Reference of the Chief Administration Officers</p>

	<p>cooking services</p> <p>Carry out relevant studies on improved options, strategies and potential impact of modern cooking services</p> <p>Develop and implement monitoring and evaluation system</p>		<p>improved cooking appliances and distribute them</p> <p>Develop a specific Capacity Development strategy for energy services (pro-poor)</p> <p>Develop a communication and advocacy strategy</p> <p>Carry out awareness raising for the civil society</p> <ul style="list-style-type: none"> - Demonstrate ICS devices and practices 	
2: Access to reliable electricity services for all urban and peri-urban poor	<p>Review the urban and peri-urban electrification plans and budgeting to include connections and utilization</p> <p>Adopt a multi-sectoral approach to urban and peri-urban electrification in urban development</p>	<p>Create incentives to facilitate connection of the poor</p> <p>Introduce regulations that sustain connection infrastructure to attract private sector participation</p>	<p>Mobilize large numbers of energy users for economies of scale</p> <p>Strengthen institutions in charge of enforcement, auditing, etc.</p> <p>Establish energy structures at the local government levels (municipalities)</p>	<p>Develop incentives for promoting private sector investment, including banks, in electricity distribution to the urban and peri-urban poor</p> <p>Develop mechanisms that ensure efficient use of electricity</p>
3: Access to modern energy services for all schools, health centres, clinics, and community	<p>Integrate modern energy services in institutions service' planning and</p>	<p>Identify policy incentives which will encourage increased connections of service institutions to</p>	<p>Pilot appropriate energy services to selected institutions</p>	<p>Develop mechanism that involve the Government, private and NGO sector in provision of energy to</p>

centres	<p>budgeting process</p> <p>Sensitize sector planners, owners and managers of institutions on energy services for institutions</p>	<p>electricity</p> <p>Include energy regulations in licensing service institutions</p> <p>Prioritize welfare-indicator based affirmative interventions for poorer areas</p>	<p>Mobilize and institutionalize communities to demand for and supervise the use of energy services</p> <p>Build the capacity of the private sector to maintain and service the energy services</p>	<p>service institutions</p> <p>Banks</p> <p>Identify and document working production and processing models and scale them up</p>
4: Access to mechanical power and efficient heating for productive uses for all communities	<p>Adopt multi-sectoral and economies of scale approach for motive power in productive initiatives</p> <p>Integrate access to mechanical power into LG and community projects (multi-sector approach) planning</p> <p>Link agricultural and enterprise development with the use of motive power</p>	<p>Promote decentralization of power production systems for productive use in communities</p> <p>Develop incentives to attract processing in the agricultural sector (e.g. infrastructure)</p>	<p>Develop capacity of entrepreneurs</p> <p>Create awareness of all stakeholders (Government, civil society, private sector)</p> <p>Identify and promote champions within institutions and centres of influence</p>	<p>Promote new energy production methods/renewable sources using pilot projects</p> <p>Initiate and promote integrated resources planning (production and utilization)</p>

Table 4.2 Synthesized Projects Outputs for the Two Year Period

Main streaming energy access in development planning	Developing pro-poor energy policies & frameworks	Strengthening Capacity to deliver energy services	Identifying business models
<p>Modern energy services (cooking-LPG, ICS, etc.- and urban and peri-urban electrification) are integrated into national, sector and local government planning and budgeting</p> <p>Leaders and planners at national, sector and local government are sensitized with respect to needs for modern energy services</p> <p>Monitoring and evaluation system for the energy sector developed</p> <p>Communication and advocacy strategy developed</p>	<p>Standards, codes and regulations for improved cooking services and electrification developed</p> <p>Mechanisms for implementation of the Renewable Energy Policy are developed</p> <p>Policy instruments that facilitate/influence urban and peri-urban poor adopt modern energy practices developed</p> <p>Policy instruments that attract urban and peri-urban poor and institutions to adopt modern energy technologies developed</p> <p>Appropriate ways of overcoming barriers to private sector participation in urban and peri-urban poor areas' electrification developed</p>	<p>Institutional setup for national and decentralized energy structures established</p> <p>Capacities of the energy services institutions are developed</p> <p>Energy structures at all levels and across stakeholders established</p>	<p>Analytical studies to identify successful models in the region and beyond for promotion of modern energy services (motive power, cooking, lighting) conducted</p> <p>Economies of scale based multi-sectoral approach developed and tested in two agro-ecological zones</p> <p>Models for integrated electrification in urban development developed</p> <p>Policy incentives that attract urban and peri-urban poor to connect to electricity are developed and tested</p> <p>Incentives for utilization of improved cooking devices are developed and integrated in planning by respective stakeholders</p> <p>Appropriate energy services in selected institutions/areas piloted</p>

Table 4.2: Workplan

Output 1: Modern cooking services (e.g. LPG, ICS, etc), urban and peri-urban electrification, modern energy provision to schools, health centres and energy for productive use are integrated into national, sector and Local government planning and budgeting

Activities and sub activities	Milestones	Responsibility	Time schedules								Budget (US\$)
			Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	
1.1 Identify and link with planning and budgeting entry points at all levels and all stakeholders (e.g. NDP, District Plans, NGOs, sectors, etc) <ul style="list-style-type: none"> Carry out consultative meetings with all stakeholders Develop communication system with the stakeholders Implement the system 	Reports of strategic contacts	MEMD	x	x							8,600 (1)
	Report of system	PMU	x	x							6,600 (2)
	Interactive forum	Focal Point, PMU			x	x	x	x	x	x	8,600 (3)
1.2 Identify the “connections” gaps in urban and peri – urban electrification plans and propose improvements <ul style="list-style-type: none"> Procure services to identify the gaps Disseminate the findings 	Report on gaps and proposals are approved by MEMD	MEMD, REA, UMEME, ERA, PMU	x	x							6,600 (4)
			15,000 (5)								
1.3 Sensitize leaders and planners on modern energy services and their role in development <ul style="list-style-type: none"> Carry out sensitization workshops with respective leaders and planners 	W/shop reports, brochures and policy briefs	Institutional Champions, Focal point, CSOs, MoLG	x	x							35,000 (6)
1.4 Identify energy focal persons and champions and assign the duties to integrate energy issues	No. Of focal point persons	MEMD, PMU, Focal	x	x							2,000 (7)

* Corresponding budget note

	identified and active TOR for duties Reports from focal points	Points										4,300 (8) 4,300 (9)
1.5 Produce and disseminate manuals/guidelines of how to the focal points and institutions (ensuring gender and poverty sensitivity) <ul style="list-style-type: none"> • Procure consultants • Disseminate the results • Publish the guidelines 	Manuals and guidelines developed, adopted and disseminated	MEMD, PMU					x	x	x	x		9,900 (10) 7,000 (11) 2,000 (12)
1.6 Follow up the budget lines for modern energy in institutions	Periodic report on plans and budget expenditure in all institutions and all levels	MEMD, PMU, MFPED, Focal Points, CSOs, Private sector					x	x	x	x		8,600 (13)

Output2: Policy instruments that facilitate/influence urban and peri-urban poor to adopt modern energy practices

Activities	Milestones	Responsibility	Time schedule								Inputs	
			Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8		
2.1 Identify and analyse barriers to access, to adoption of modern services by poor	Analytical reports	MEMD, PMU	x	x								

<ul style="list-style-type: none"> Procure analytical services Carry out consultative workshops 	Workshop reports											6,600 (14)	
												7,000 (15)	
2.2 Identify and analyse barriers to participation of private sector in provision of electrification and modern energy services <ul style="list-style-type: none"> Procure analytical services Carry out consultative workshops 	Analytical reports	MEMD, PMU	x	x	x							6,600 (16)	
	Workshop reports											7,000 (17)	
2.3 Develop appropriate policy instruments /interventions to facilitate private sector participation (e.g. incentives, legal, institution, structures, codes) <ul style="list-style-type: none"> Conduct consultative meetings Publish the instruments Lobby for approval of the instruments 	Relevant policy instruments developed (act, orders)	MEMD/PMU, stakeholders	x	x	x	x						4,300 (18)	
													2,000 (19)
2.4 Develop a roll out plan to facilitate implementation <ul style="list-style-type: none"> Conduct dissemination meetings 	Plan of Action developed and implemented	MEMD, REA, PMU, PSFU, LGs, CSO,						x	x	x	x	4,300 (21)	

Output 3 : Standards, codes and regulations for implementation of the renewable energy policy are developed

Activities	Milestones	Responsibility	Time schedule									
			Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8		
3.1 Adapt the regional codes and standards to the national conditions (biomass, electrification, LPG, etc) <ul style="list-style-type: none"> Publish framework Distribute and disseminate 	National C & S adopted by the government	MEMD, PMU, UBOS				x	x	x				2,000 (22)
3.2 Review and develop regulations and bi-laws to enforce implementation of codes and standards <ul style="list-style-type: none"> Work with parliament, LGs and other stakeholders to review regulations 	Regulations and bi-laws are in place	MEMD, PMU District Councils,, MoLG				x	x	x				8,600 (24)
3.3 Disseminate codes, standards and regulations	No. Of	MEMD,								x	x	

<ul style="list-style-type: none"> Publication and distribution of codes and standards Carry out sensitization workshops 	manuals disseminated	NGO, Private sector, LCs, PMU											2,000 (25)
	No. of dissemination meetings												

Output 4: Capacities of Energy services institutions are developed

Activities:	Milestones	Resp	Time Schedule											
4.1 Develop the institutional set up for national, sectoral and decentralised energy structures <ul style="list-style-type: none"> Meeting government institutions and LGs Develop institutional structure Carry out consultation meetings 	National and institutional framework designed	MEMD, EAC, PMU	x	x	x	x								2,000 (27) 6,600 (28) 2,000 (29)
4.2 Carry out capacity needs assessment of energy <ul style="list-style-type: none"> Procure assessment services Carry out consultation workshops 	Capacity needs assessment report Workshop reports	MEMD /PMU,	x	x										6,600 (30) 35,000 (31)
4.3 Develop a capacity building strategy that incl. CSO, Private sector, etc <ul style="list-style-type: none"> Develop strategy Publish strategy Communicate strategy among stakeholders 	Strategy for capacity building of energy services institutions	MEMD, PMU			x	x								9,900 (32) 10,000 (33) 6,600 (34)
4.4 Implement capacity building programme <ul style="list-style-type: none"> Organize and implement trainings, study tours, exchange visits 	Study tours, exchange visits, seminars, changes education curriculum	MEMD, EAC, Private sector,						x						45,000

Output 5: Economies of scale based, multisector approach (models) developed and piloted in two agro-ecological zones

Activities	Milestones	Responsibility	Time schedule								
			Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	
5.1 Select pilot model areas <ul style="list-style-type: none"> • Analyse candidate models • Carry put dissemination workshops • Develop guidelines for production and use of biofuels • Disseminate 200,000 ICS in households and institutions (Models are to be piloted for PV for lighting and refrigeration, ICS for households and institutions, Scaling up motive power, LPG)	Analytical report on appropriate business models	MEMD, Sector Focal Points	x	x	x	x	x	x	x	x	13,200 (36) 35,000 (37) 19,800 (38) (400,000) (39) (200,000) (40)

6. Monitoring and Evaluation system for modern energy sector is developed

Activities	Milestones	Responsibility	Time schedule								
			Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	
6.1 Develop appropriate M&E system to meet the needs of modern energy <ul style="list-style-type: none"> • Review the existing M&E system • Develop appropriate indicators and assumptions • Develop instruments to collect and aggregate information • Adapt the communication and advocacy strategy • Use the information to influence policy changes 		MEMD, PMU, NIMES, PMAU, UBOS, CSOs	x	x	x	x	x	x	x	x	6,600 (41) 3,300 (42) 3,300 (43) 3,300(44) 6,600 (45) 8,600 (46)
GRAND TOTAL										461,000 (47)	

NOTES ON THE BUDGET

No.	Explanation
1	20 people, 10 meetings, \$60 for venue, \$40 transport per person
2	A consultant for one month at 300\$ per day plus a workshop

3	20 people, 10 meetings, \$60 for venue, \$40 transport per person
4	A consultant for one month at 300\$ per day plus a workshop
5	\$7000 dissemination workshop and 8000\$ for printing and distributing documents and brochures
6	One Central and four regional \$10000 each
7	Travel to visit organizations and meet their staff
8	20 people, 5 meetings, \$60 for venue, \$40 transport per person
9	20 people, 5 meetings, \$60 for venue, \$40 transport per person
10	A consultant for 1.5 months at 300\$ per day plus a workshop
11	\$7000 dissemination workshop a
12	Printing and distributing documents and brochures
13	20 people, 10 meetings, \$60 for venue, \$40 transport per person
14	A consultant for one month at 300\$ per day plus a workshop
15	\$7000 dissemination workshop a
16	A consultant for one month at 300\$ per day plus a workshop
17	\$7000 dissemination workshop
18	20 people, 5 meetings, \$60 for venue, \$40 transport per person
19	Printing and distributing documents and brochures
20	Travel to visit organizations and meet their staff

21	20 people, 5 meetings, \$60 for venue, \$40 transport per person
22	Printing and distributing documents and brochures
23	\$7000 dissemination workshop
24	20 people, 10 meetings, \$60 for venue, \$40 transport per person
25	Printing and distributing documents and brochures
26	\$7000 dissemination workshop a
27	Travel to visit organizations and meet their staff
28	A consultant for one month at 300\$ per day plus a workshop
29	Travel to visit organizations and meet their staff
30	A consultant for one month at 300\$ per day plus a workshop
31	\$7000 dissemination workshop a
32	A consultant for 1.5 months at 300\$ per day plus a workshop
33	Printing and distributing documents and brochures
34	A service provider for one month at 300\$ per day plus a workshop
35	\$3000 Training sessions for various stakeholders
36	A consultant for two months at 300\$ per day plus a workshop
37	A consultant for three months at 300\$ per day plus a workshop

37	\$7000 dissemination workshop a
39	200,000 ICS at the rate of \$2 each not included in the GRAND TOTAL
40	2000 units at \$100 each piloted not included in the GRAND TOTAL
41	A consultant for one month at 300\$ per day plus a workshop
42	A consultant for 0.5 month at 300\$ per day plus a workshop
43	A consultant for 0.5 month at 300\$ per day plus a workshop
44	A consultant for one month at 300\$ per day plus a workshop
45	20 people, 10 meetings, \$60 for venue, \$40 transport per person
46	(Excludes \$600,000 for the pilot modern energy devices)

5.0 Annexes

Annex 1: List of Individuals and agencies contacted

No.	Name	Position	Agency/Company
1.	Mr. Elsam Turyahabwe	EAC Strategy Focal Point	MEMD
2.	Dr. Albert Rugumayo	Coordination Manager	ERT, MEMD
3.	Mr. Paul Nteza	Programme Analyst – Environment Poverty Reduction Unit	UNDP Kampala
4.	MR. Wilson Kwamya	the Assistant Resident Representative (Programme) - Poverty Reduction	UNDP Kampala
5.	Mr. Hassan Nyenje	LPG Sales Executive	Kobil (U) Ltd
6.	Mr. Baker G. Akantambira	Senior Inspector	ERT Coordinator, MOLG
7.	Mr. Moses Murengezi	Monitoring and Evaluation Manager	Rural Electrification Agency (REA)
8.	Mr. Charles Sabiti	Finance and Administration Manager	Rural Electrification Agency (REA)
9.			
10.	Mr. Philippe Simonis	Energy Advisor	Energy Advisory Project, MEMD
11.	Mr. Robert Bujara	LPG Manager	Shall(U) Ltd
12.	Eng. Paul Mubiru	Commissioner	Energy Resources Department, MEMD
13.	Mr. Cuthbert Mulyalya	ERT Coordinator	Education Planning Dept, MOES
14.	Mr. Paul Baringanire	Energy Desk Officer	World Bank
15.	Dr. Tom Oti	Department of Physics	Makerere University
16.	Dr. I. Da Silva	Department of Electrical Engineering	Makerere University

17.	Dr. A. M. Sebbit	Department of Mechanical Engineering	Makerere University
18.	Mr. Peter Mugenzi	ERT	In charge of GIS Database, MEMD
19.	Mr. Kigozi	Stastician	Ministry of Education and Sports
20.	Ms. Margaret Kakande	Poverty Analyst	Ministry of Finance Planning and Economic Development
21.	Mr. Jams C. Tibenkana	Finance Officer	Desk Officer for Energy and Mineral Development, MOFPED
22.	Eng. S. Wanda	Asst. Commissioner Engineering	Ministry of Health
23.	Mr. S. Mulepo	Mecahnical Engineer	Ministry of Health.
24.	Mr. Robert Kisubi	Customer Manager	Umeme Ltd
25.	Dr. S. Tickodri Togboa	Uganda Electricity Generation	Company Ltd
26.	Dr. Polycarp Musinguzi	Executive Director	Bank of Uganda
27.	Mr. Akram Ziiwa	Customer Services Consultant	Chevron Uganda Limited
28.	Mr Emmanuel Mangeni	Business Consultant LPG	Chevron Uganda Limited
29.	Mr. Fredrick I.M. Ssozi	Ag. Asst Commissioner	Ministry of Agriculture
30.	Dr. James Mutende	Senior Investment Executive	Uganda Investment Authority
31.	Ms. Emasit		Private Sector Foundation Uganda
32.	Mr. M.L. Mukiibi	Secretary	Energy Institute of Uganda
33.	Mr. Mugisha	Ag. Commissioner	Ministry of Water and Environment

34.	Ms. Agnes Nanda	Credit Support Officer	Bank of Uganda
35.	Prof. John Munene	Institutional Development Consultant	Makerere University

Annex 2: List of Attendees at the Validation Workshop

The following persons were consulted and participated in the validation workshop

No	Name	Contact
1	Omodo McMondo Daniel	UNDP Kampala
2	Watta Ivan	Makerere University Faculty of Technology
3	Fiona Florence Driciru	National Forestry Authority
4	Hatwib Kasiita	Shell Uganda Ltd
5	Tom Otiti	Makerere University Department of Physics
6	Paul Kirai	EAC Consultant
7	Emmy Kimbowa	Energy systems (Ltd)
8	Babirye Sophia	Energy systems (Ltd)
9	Ssebugwawo Geoffrey	BUDS-ERT Private Sector Foundation
10	Sitra Mulepo	Ministry Of Health
11	Turyahebwa Elsam	Ministry of Energy and Mineral Development
12	Godfrey Ndawula	Ministry of Energy
13	Mikiibi Martin Luther	Energy Institute of Uganda
14	Musooka Kiwanuka	Energy Promoters Network
15	Amulen. A.	UBC Radio
16	Nyenje Hasan	Kobil Uganda (Ltd)
17	Nele Degracule	Ministry of Finance Planning and Economic Development
18	James Tibenkana	Ministry of Finance Planning and Economic Development
19	Kabishanga Emmanuel	New Horizons
20	Chales Baker	Electricity Regulatory Authority
21	Ndagire Specioza	Bank of Uganda
22	Mbaasa Denis	Makerere University Faculty of Technology
23	Kagele Bashir	Uganda National Council of Science and Technology
24	Grace Musimami	Farmers Media
25	Lufafa Dick	National Environment Management Authority
26	Dr. Da Silva	CREEK
27	Joan. K. Mutiibwa	Ministry of Energy and Mineral Development
28	Mbonye Arsen	Ministry of Energy and Mineral Development
29	Henry Bazira	National Association of Professional Environmentalists
30	Godfrey Ssali	Africa Centre for Research and

		Development
31	Mackay Okure	Makerere University Department of Mechanical Engineering

Annex 3: Attendees at the Regional Workshop

The following persons participated in the regional workshop

1. Bagabo Samuel Michael
Executive Director
Integrated Rural Development Initiatives
P. O. Box 10596
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2. Turyahabwe Eslam
Principal Energy Officer
P. O. Box 7270
Kampala, Uganda
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Fax: 006 414 349342
E-mail: turyahabwe@yahoo.co.uk

3. Rosetti Nabbumba Nayenga
Policy Analyst
Ministry of Finance, Planning and Economic Development
P. O. Box 8147
Kampala, Uganda
Tel: 006 772487225
E-mail: rosette.nabbumba@finance.go.ug Or rnabbumba@yahoo.com

Annex 4: Key Reference Documents Used

1. Electricity Act 1999, The Uganda Gazette No. 56 Vol. XCII, Kampala 1st November 1999

2. Rural Electrification Strategy and Plan Covering the Period 2001 to 2010, Ministry of Energy and Mineral Development, Government of Uganda, Kampala, February 2001

3. The Electricity (Establishment and Management of the Rural Electrification Fund) Instrument, 2001, The Uganda Gazette No. 56 Vol. XCIV, Kampala 11th December 2001
4. The Uganda Forestry Policy, Ministry of Water and Environment, Kampala, 2001
5. The Energy Policy for Uganda, Ministry of Energy and Mineral Development, Government of Uganda, Kampala, September 2002
6. National Biomass Study, Ministry of Water and Environment, Government of Uganda, Kampala, November 2003
7. Uganda Energy Balance, Ministry of Energy and Mineral Development, Government of Uganda, Kampala, 2004
8. Poverty Eradication Action Plan 2004/5 – 2007/8, Ministry of Finance, Planning and Economic Development, Kampala, December 2004
9. 2005 Annual Report, Ministry of Energy and Mineral Development, Kampala, 2006
10. 2006 Statistical Abstract, Uganda Bureau of Statistics, Kampala, December 2006
11. 2002 Uganda Population and Housing Census. Analytical Report, Abridged Version, Uganda Bureau of Statistics, Kampala, June 2006
12. 2005/06 Uganda Household Survey, Uganda Bureau of Statistics, Kampala, December 2006
13. ERT Health Component – Final Baseline Report and Capacity Building Plan, Ministry of Health, Kampala, 2006
14. Background to the Budget, Ministry of Finance, Planning and Economic Development, Kampala, June 2007
15. ERT Quarterly Report, June – September 2007, Ministry of Energy and Mineral Development, Kampala, October 2007
16. Millennium Development Goals. Uganda's Progress Report 2007, UNDP, Kampala, October 2007
17. The Renewable Energy Policy for Uganda, Ministry of Energy and Mineral Development, Government of Uganda, Kampala, November 2007
18. State of the Environment Report for Uganda 2006/07, National Environment Management Authority, Kampala, November 2007

Annex 3: Umeme Ltd Billing Per District in 2006

District	Billing(kWh)	Customers	Region	Totals
Kampala	10,263,343.0	94,937	Central Uganda	
Wakiso	5,845,308.0	50,773	Central Uganda	
Rakai	180,567.5	1,500	Central Uganda	
Masaka	1,289,768.1	10,732	Central Uganda	
Nakasongola	63,063.2	398	Central Uganda	
Luweero	1,313,816.8	8,226	Central Uganda	
Kiboga	52,269.9	700	Central Uganda	
Mubende	565,691.1	7,579	Central Uganda	
Kayunga	279,208.4	2,939	Central Uganda	
Mukono	12,280,149.8	11,120	Central Uganda	
Mpigi	313,519.9	1,178	Central Uganda	
Kalangala	0.0	0	Central Uganda	
Sembabule	0.0	0	Central Uganda	190,082.0
Mayuge	0.0	512	Eastern Uganda	
Bugiri	0.0	1,022	Eastern Uganda	
Iganga	0.0	3,477	Eastern Uganda	
Pallisa	0.0	1,364	Eastern Uganda	
Sironko	0.0	800	Eastern Uganda	
Kumi	0.0	540	Eastern Uganda	
Mbale	0.0	5,593	Eastern Uganda	
Soroti	0.0	2,871	Eastern Uganda	
Kaberamaido	0.0	140	Eastern Uganda	
Kapchorwa	65,085.8	347	Eastern Uganda	
Moroto	51,808.1	388	Eastern Uganda	
Jinja	7,327,042.1	11,478	Eastern Uganda	
Kamuli	309,371.5	2,419	Eastern Uganda	
Busia	3,897,437.3	2,330	Eastern Uganda	
Tororo	13,717,539.0	1,972	Eastern Uganda	
Nakapiripirit	0.0	0	Eastern Uganda	
Katakwi	0.0	0	Eastern Uganda	35,253.0
Pader	0.0	530	Nothern Uganda	
Apac	0.0	633	Nothern Uganda	
Lira	0.0	2,510	Nothern Uganda	
Kitgum	150,601.5	793	Nothern Uganda	
Moyo	43,778.4	411	Nothern Uganda	
Gulu	587,588.8	2,414	Nothern Uganda	
Kotido	0.0	0	Nothern Uganda	7,291.0
			South Western	
Hoima	441,845.3	2,306	Uganda	
Masindi	437,944.1	2,116	South Western	

			Uganda	
			South Western	
Kasese	3,596,449.0	3,436	Uganda	
			South Western	
Kyenjojo	1,069,865.7	100	Uganda	
			South Western	
Fort Portal	3,293,411.5	3,206	Uganda	
			South Western	
Kamwenge	241.5	868	Uganda	
			South Western	
Bundibugyo	0.0	0	Uganda	
			South Western	
Kibaale	0.0	0	Uganda	12,032.0
Kisoro	0.0	760	Western Uganda	
Kabale	0.0	3,705	Western Uganda	
Rukungiri	169,459.5	1,482	Western Uganda	
Bushenyi	807,878.3	2,621	Western Uganda	
Mbarara	1,931,500.2	6,872	Western Uganda	
Ntungamo	241.5	815	Western Uganda	
Kanungu	0.0	0	Western Uganda	16,255.0
Yumbe	0.0	0	West Nile	
Nebbi		2,000	West Nile	
Adjumani		1170	West Nile	
Arua		2000	West Nile	5,170.0
		266083		266,083.0
Column1	Column2			
central	190,082.0			
Northern	7,291.0			
Western	16,255.0			
South				
Western	12,032.0			
West Nile	5,170.0			
Eastern	35,253.0			