

Investing in Uganda's Energy Sector

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1.0 BACKGROUND TO ENERGY SECTOR

The Energy Sector is one of the key sectors in the Ugandan economy. On one side the sector provides a major contribution to the Treasury resources (e.g. fuel taxes, VAT on electricity, levy on transmission bulk purchases of electricity, license fees and royalties) and foreign exchange earnings (power exports). On the other side significant public investment has been injected into the sector, particularly in the area of electricity supply. Following liberalization, the power sub-sector is now attracting the largest private sector investments in the country. Therefore, the sector is not only a vital input into other sectors, but also promises to be a large source of employment for Ugandans.

The Ministry of Energy and Mineral Development (MEMD) is responsible for the sector, dealing specifically with energy policy formulation, implementation and monitoring.

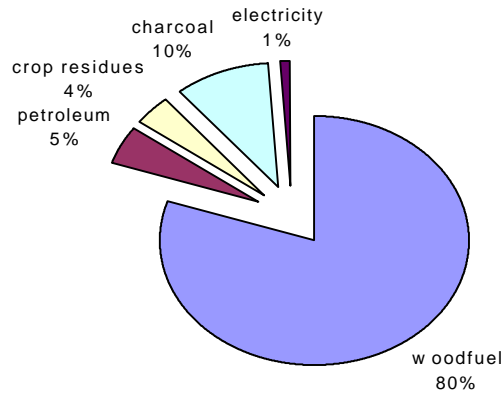
The energy sector in Uganda comprises the following supply sub-sectors:

- i. Power;
- ii. Petroleum;
- iii. New and Renewable Sources of Energy; and
- iv. Atomic Energy.

Uganda's per capita energy consumption of 0.3 TOE or 12.72 GJ, is among the lowest in the world. Few people have access to modern energy supplies such as electricity and petroleum products. The energy consumption stands at about 5 million TOE/year of which approximately 94% is biomass (wood, charcoal and agricultural residue).

Wood fuel is the dominant energy source accounting for 80 per cent of the total energy consumed in the country. Wood fuel is consumed either as charcoal (largely consumed in urban areas) or firewood (mostly used in rural areas). Figure 1 shows the dominant position of wood fuel in the energy sector of Uganda.

Figure 1 Uganda's Energy Consumption



Total wood production registered a steady increase over the period 1995-1999. Fuel wood used by households constituted a big percentage of all wood used.

Government is studying ways to meet the increasing energy demand from other indigenous energy sources. As part of this effort, Government with the support of the African Development Bank is undertaking a study whose aim is to formulate a long term integrated least-cost alternative energy resource development programme for the country. The energy sources being considered include geothermal, biomass, wind, peat, solar and mini- and micro- hydro.

The total demand is estimated to be approximately 580 MW by the year 2005. The major hydroelectric plant, the Nalubaale (Owen Falls) dam on the Nile River was rated at 180 MW in 1999. An extension, the Kiira plant was commissioned in 2001 and is rated at 200 MW. However, only 120 MW has been put on line bringing the total generation capacity to 317.

Energy contributes significantly to the financing of public expenditures. In Uganda, petroleum taxes provide a significant proportion to the total fiscal revenues. Table 1 shows the percentage contribution of taxes on petroleum products to total revenue over the period 1995/96-2001/2.

Table 1 Uganda; Contribution of Taxes on Petroleum Products to Total Revenue: 1995/96-2001/2

Year	1995/6	1996/7	1997/8	1998/99	1999/00	2000/1	2001/2
Actual Contribution (million U. Shs)	150,962	197,332	187,927	193,208	196,800		
% Contribution	22.3	27.3	23.3	19.7	19.2		

Source Uganda Revenue Authority

The energy sector contributes to export earnings through exports of electricity. Table 2 shows that while still small, the percentage contribution of electricity to the total export earnings has been rising over the period 1997-2001, save for the period 1998/99.

Table 2 Uganda; Contribution of Energy Exports to Total Export Earnings: 1997-2001

Year	1997/98	1998/99	1999/00	Proj. 2000/01
Actual Contribution (million US \$)	11.96	12.27	13.76	17.0
% Contribution	0.03	0.02	0.03	0.04

Source Bank of Uganda

2.0 GOVERNMENT POLICY

Energy is the life-blood of development. Energy supply is part of the poverty eradication process. The present Energy Policy for Uganda will allow the population to meet one of its basic needs in a sustainable manner.

The Policy will focus on:

- developing positive linkages between the energy sector, poverty alleviation and economic growth;
- integrating the objective of environmental sustainability into all energy initiatives;
- demand side management and energy efficiency;
- developing an energy resource base and dissemination of key information;
- promoting private participation and the development of competitive markets in energy technology and services; and
- developing, where necessary, appropriate regulatory frameworks and capacity.

The Policy will be the basis for progressively expanding investment in modern energy production, petroleum exploration and development, rural electrification, the supply of well

priced petroleum products, and for increasing the efficiency of energy use in all sectors from the household consuming biomass for cooking to the big industries and the transport sector.

3.0 SECTORAL PERFORMANCE

3.1 Petroleum

The petroleum sub-sector provides about 5 per cent of the country's energy consumption requirements. Petroleum products are obtained entirely through imports. Although petroleum production in Uganda has not been established, the hydrocarbon generating capacity of its rift basins is very evident.

- **Petroleum Supplies and Distribution**

The petroleum import bill is now of the order of US\$ 160 million per year. This constitutes about 8% of total national imports and represents slightly above 20% of total export earnings.

Consumption of petroleum in Uganda currently stands at 550,000 m³ per annum. The consumption of petroleum products has in the last seven years increased by 42 per cent from 386,638 cubic metres in 1995 to 548,042 cubic metres in 2001, whereas between 2000 and 2001, it increased by 6 per cent (see Table 3). Total petroleum fuel sales registered an increase in the period 2000-2001 as compared to the period 1999-2000. Except for Kerosene which had a decrease in sales, all other types of fuel registered positive changes of 5% and above in annual sales. The general positive change in sales can be attributed to the Government's effort to curb smuggling of fuel into the country.

Table 3 Uganda; Consumption of Petroleum Products (cubic metres) by Type: 1995-2001

Year	Petrol	Aviation Fuel	Diesel	Fuel Oil	Kerosene	LPG	Total
1995	166,048	31,556	120,395	24,566	43,068	1,005	386,638
1996	181,777	42,241	124,348	29,468	43,425	1,420	425,615
1997	177,044	44,643	125,621	12,5621	48,579	1,629	431,637
1998	191,977	60,708	150,908	39,384	60,062	1,841	504,880
1999	201,127	51,072	167,576	40,782	72,087	2,200	534,844
2000	191,116	41,530	187,453	38,501	56,050	2,390	515,040
2001	199,956	43,916	207,183	38,591	55,504	2,892	548,042

Source: Uganda Bureau of Statistics. 2002 Statistical Abstract

Table 4 shows Uganda's import bill on petroleum and related products over the period 1997-2002.

Table 4 Uganda's Import Bill on Petroleum and Related Products ('000 US \$): 1997-2001

Year	1997	1998	1999	2000	2001
Import Bill on Petroleum	115,987	111,566	121,739		
As % of Total Import Bill	8.9	6.8	8.9		
Total Import Bill	1,307,523	1,633,676	1,362,940		

Source; Uganda Revenue Authority

There are 20 licensed oil-marketing companies in Uganda of which 15 are in operation. There is no national oil company. However Government maintains fuel reserves at Jinja for strategic purposes. Government is offering temporary storage accommodation at its Jinja Storage Tanks as an incentive to the newly licensed oil companies to encourage competition.

- **Petroleum Exploration**

Although petroleum production in Uganda has not been established, the hydrocarbon generating capacity of its rift basins is very evident. The principal prospective area for petroleum in Uganda is the Albertine Graben, which forms the northern most part of the western arm of the East African Rift Valley. It stretches from the border with Sudan in the north to Lake Edward in the south, a distance of over 500km. Although of variable width, the Graben is commonly 45 km wide and extends into the Democratic Republic of Congo in some parts. An agreement of co-operation for exploration and exploitation of any common fields between the two countries is in place.

Exploration acreage

The Government of Uganda has defined five Exploration Areas (EA's) in the Albertine Graben as shown in Figure 1. These EA's comprise of the following sizes:

Exploration Area 1 – 4,285 Square Kilometres.

Exploration Area 2 – 4,675 Square Kilometres.

Exploration Area 3 – 4,630 Square Kilometres.

Exploration Area 4 – 5,913 Square Kilometres.

Exploration Area 5 – 6,040 Square Kilometres.

Out of these five Exploration Areas, Exploration Area 2 was licensed to Hardman Petroleum Resources in October 2001 and Exploration Area 3 to Heritage Oil and Gas in January 1997.

Exploration Areas 1, 4 and 5 are available for licensing. Energy Africa of South Africa is a 50% joint venture partner in the two companies.

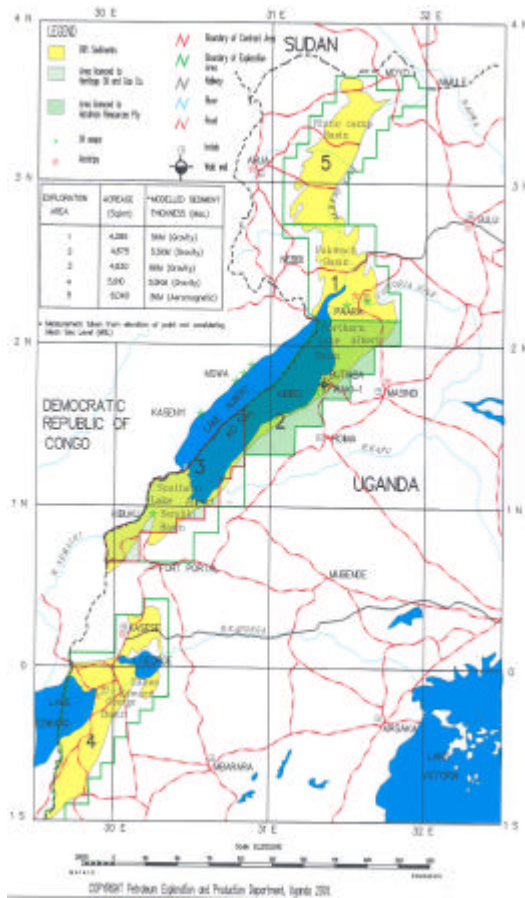


Figure 2: Exploration Areas in the Albertine Graben.

Within the framework of the 1985 Petroleum (Exploration and Production) Act, the Government of Uganda, through the Ministry of Energy and Mineral Development (MEMD) is prepared to enter into production sharing agreements with responsible companies for mutually beneficial exploration, development and production of hydrocarbons in Uganda. The Petroleum Exploration and Production Department (PEPD) in the Ministry of Energy and Mineral Development is the technical arm responsible for the initiation and supervision of these agreements and manages the data relevant to upstream petroleum activities in the country. Contacts of the Commissioner of Petroleum Exploration and Production Department are provided on page 18 of this profile.

- **Eldoret / Kampala Oil Pipeline Extension Project**

Discussions are going on between the governments of Kenya and Uganda to find the best option of implementing the project as a means to minimize the cost of delivery of petroleum products from the seaports. The existing pipeline connects these from Mombasa to Eldoret in Kenya. Eldoret is only a few miles from the Malaba/Busia border towns in eastern Uganda. Three modes of implementation are envisaged: - Joint government development; Government/Private sector or Private sector alone. This may represent an investment opportunity for the private sector.

3.2 Power

The Power Sector Strategic Plan 1999

In June 1999, Government formulated a power sector strategic plan aimed at the following:

- Make the power sector viable and able to perform without subsidies from the Government budget
- Attract private capital and entrepreneurs
- Increase the sector efficiency
- Increase the sector's commercial performance
- Improve quality and reliability, and
- Take advantage of export opportunities

The plan spelt out Government policy on the reform of the sector and eventual privatization of the Uganda Electricity Board after unbundling into generation, transmission and distribution. It also proposed that the generation and distribution businesses should be concessioned to private sector players while the transmission business remains in public hands in the medium term. Accordingly, Government concessioned the generation business to Eskom (U) Limited in November 2002 and negotiations are soon to be concluded for concessioning the distribution business to a consortium of CDC Capital Financiers and Eskom.

The hydroelectric power potential of Uganda is high and estimated at over 2,000 MW, mainly along the River Nile. Current exploitation is about 317 MW, of which 300 MW is on the River Nile and generated by the Uganda Electricity Generation Company Limited. Kilembe Mines Ltd., Kasese Cobalt Company Ltd and others generate a total of 17 MW. Two major independent power producers, AES Nile Power and Norpak Power Company are in various stages of setting up large power plants. Their combined capacities will be 450 MW when completed.

Uganda's electrification rate is very low, with grid access of only 5% for the whole country and less than 2% in rural areas. This means that only 200,000 customers are connected to the grid with an annual growth rate estimated between 5.5 and 7.5%. Another 1% of the population provides itself with electricity using diesel and petrol gensets, car batteries and solar PV systems. Electricity is consumed by the residential (55%), the commercial (24%) and the industrial (20%) sectors and for street lighting (1%).

In terms of network infrastructure development, there is a total of 1,115 km of 132 kV high voltage transmission lines and 54 km of 66 kV in the country. The distribution facilities include 3,258 km of 33 kV lines, 3,443 km of 11 kV lines and 6,496 km of low voltage lines. This network provides power to only 33 of the 56 districts in the country.

The Uganda Electricity Transmission Company Limited has export contract obligations to neighboring countries as follows: Kenya (30 MW), Tanzania (9 MW) and Rwanda (5 MW). However, the 30 MW to Kenya is supplied only during off-peak hours and only 9 MW and 5 MW exports go to Tanzania and Rwanda respectively. However, arrangements have been finalized for Uganda to export firm capacity of 50 MW to Kenya from 2006 after the commissioning of the Bujagali Project.

Table 5 shows the country's electricity capacity and generation over the period 1995-1999. Domestic power demand is estimated to be growing at 2 per cent per month.

Table 5 Uganda; Electricity Capacity and Generation: 1995-1999

Capacity/Generation	1995	1996	1997	1998	1999	2000	2001	2002
Installed Capacity (MW)								
Owen Falls	177.0	180.0	180.0	180.0	180.0			
Other Stations	3.4	3.0	3.0	3.0	3.0			
Total Capacity	180.4	183.0	183.0	183.0	183.0			
Units Generated (million kWh)								
Hydro-Electric	1056.3	1129.0	1217.3	1232.4	1340.4			
Diesel	1.1	1.1	1.2	1.2	1.2			
Total Units Generated	1057.4	1130.1	1218.5	1233.6	1341.6			
<i>Of which:</i>								
Transit & Distribution losses	342.3	296.5	340.1	Na	Na			
Units Accounted by Consumption	713.7	831.2	878.3	Na	Na			
Maximum Demand (MW)	173.6	177.0	178.6	179.8	180.0			
Annual Load Factor (%)	70	71.0	77.9	78.3	85			

Source: Uganda Bureau of Statistics. 2000 Statistical Abstract

Given the capital intensity of the power investments and in line with government's commitment to attract private capital and expertise in the provision of utilities, the sector has been opened to private investment. Two initiatives are being planned to open up the sector to Foreign Direct Investment (FDI): - Independent power generation projects, and Privatization of elements of the UEB.

The Electricity Act 1999

The change in policy documented under Section 2.0 of this profile required a legal framework for implementation. In November 1999, the Parliament of Uganda enacted the Electricity Act 1999 which gave the legal backing to the various reforms in the power sector. The Act ended monopoly in the power sector and ushered in a new era of private sector participation.

The Electricity Regulatory Authority (ERA)

To ensure fair play in the sector, the Act created the Electricity Regulatory Authority (ERA) that became operational in April 2000. The ERA is an independent regulator with mandate under the law to do the following among others:

- Issue and modify generation, transmission, distribution and sales licences for electricity
- Establish electricity tariff structures
- Develop and enforce electricity performance standards, and
- Advise the Minister of Energy on electricity projects

ERA is also obliged to perform in a manner that is open, objective, fair, reasonable, non-discriminatory, and promote fair competition.

Other Appeal Structures

Any stakeholder who may not be satisfied with ERA's decisions is free to appeal to the Electricity Tribunal. The tribunal is not yet in place but will be inaugurated shortly. Resort to courts of law is open under the Act after exhausting the Electricity Act Appeal Structures.

Rural Electrification Strategy and Plan (2001)

Under the Electricity Act 1999, Section 63 obligates Government to promote, support, and provide rural electrification through public and private sector participation. The aims are:

- Achieve equitable regional distribution
- Maximize economic, social and environmental benefits of rural electrification subsidies, and

- Promote grid extensions, off-grid electrification and stimulate innovations within supplies

To comply with this legal requirement, the Ministry of Energy and Mineral Development developed the Rural Electrification Strategy and Plan for the period 2002 to 2012. The objective of the strategy and plan, which was completed in February 2001, is to increase rural electrification rate from 1% at the time to at least 10% by 2012. To achieve that target, at least 400,000 households have to be connected using grid extension, off-grid systems, solar PVs and others.

Uganda is currently pursuing two rural electrification projects. The purpose of the first project is to subsidize private investment in the rural network expansion – Energy for Rural Transformation (ERT) program. This World Bank funded project will inject US \$ 439 million over a period of 10 years with the goal of increasing rural access from 1 per cent to 10 per cent. There exists an opportunity of vending by the private sector with subsidies from government. The second program is a three-year pilot program aiming at connecting 2,000 customers with off-grid solar. Solar power is useful for low consumption areas that are far from the existing grid. The third prong of Uganda’s strategy is to increase low cost hydro generation.

Energy for Rural Transformation (ERT) Programme

The Government of Uganda, with support of the World Bank, is to fund the ERT program that aims to increase access to modern, clean and affordable energy to the rural areas by 2012. The activities under this program include rural electrification, promotion and dissemination of information, renewable energy capacity building, assessment and database development, development and implementation of renewable energy and rural electrification mater plans that will form the basis for selection and sequencing of priority rural electrification projects.

In December 2001, the World Bank Board approved the ERT programme and agreements were signed on 20th December 2001. Parliamentary approval of the loan component was obtained on 6th May 2002. The global purpose of the 10-year ERT programme is to contribute to global environmental protection by reducing greenhouse emissions. It will therefore benefit from the Global Environmental Facility (GEF) and the Prototype Carbon Fund (PCF). The country objectives are:

- Put in place a conducive environment and related capacity for
 - i. A commercially oriented service delivery of energy and ICT

- ii. Small-scale renewable power generation schemes to be carried out by eligible enterprises
- o Facilitate investment in:
 - i. Commercially oriented rural electrification schemes
 - ii. Scaled-up delivery of electricity in rural areas
- o Accelerate rural access to basic telephone services and spread internet services to district capitals and other vanguard institutions.

The ERT programme is to be implemented in 3 phases. The first phase will start with more of capacity building and some investments. The second phase will aim at accelerating or building momentum for investment while the third phase will be a rapid scale-up and consolidation of institutional build-up. The financing plan for the 3 phases is as follows:

Table 6

PHASE	Forecast in millions of US\$		
	IDA	Others	Total
Phase 1: 2002-2006	49.15	74.16	123.31
Phase 2: 2006-2009	45.00	75.00	120.00
Phase 3: 2009-2012	71.00	125.00	196.00
TOTAL	165.15	274.16	439.31

Source: Ministry of Energy and Mineral Development

The fast track projects to be implemented under the ERT programme include:

- i. **The West Nile Power Project (isolated grid):** This will involve mainly generation at River Nygak and later at Olewa to supply power to Arua and Nebbi Districts. Through a system of competitive bidding, Government selected Uganda Rural Electrification Company Limited (URECL) as the winning bidder. The International Finance Corporation (IFC) is promoting the Uganda Rural Electrification Company Ltd.
- ii. **Kakira Cogeneration Project:** This project is based on the need to expand production of sugar at Kakira. This will call for a bigger co-generation plant whose excess energy will be sold to the Grid.
- iii. **Kanungu, Rukungiri, Bushenyi Power Project:** This project is to be developed by the same company as West Nile (i.e. URECL). URECL will build a mini

hydro plant Ishasha River and generate about 5 MW of electricity that will be distributed in the three districts. Unlike West Nile, however, this project will be interconnected with the main grid.

- iv. **Kisiizi Micro-hydropower Project (isolated grid):** Kisiizi hospital has a small hydro from which it generates some 60 KW of electricity. Under the ERT programme, Kisiizi generation is to be increased to about 200 KW and sell electricity to people near the hospital as an independent grid. This will serve as a demonstration project for small investments in independent grid power for rural areas. Even smaller projects will be welcome.

Financing Structure under ERT

Funding of the fast track projects and other rural electrification projects will be through the Rural Electrification Fund (REF) managed by the Rural Electrification Board (REB). Before the formation of the Electrification Agency, the Ministry of Energy and Mineral Development will be handling this portfolio. However, facilities for Solar PV systems will mainly be based in the Private Sector Foundation of Uganda (PSFU).

Can the rural people pay for electricity? In 1994, the Government requested World Bank / ESMAP assistance to carry out a Rural Electrification Strategy Study in Uganda. The Department of Energy executed the study in 1996-1997. Interestingly, the following were some of the observations of the study:

- >Rural people in Uganda currently pay high prices for a limited and inefficient supply of electricity.*
- >Ugandans probably spend more than US\$ 100 million per year on batteries.*
- >In 1996, there were probably about an equal number of Ugandans with a grid connection as with a car battery for their electricity supply.*
- >Many Ugandan firms had purchased their own generating sets the equivalent of one-third of the capacity of the national utility (more than 60 MW), and spent nearly US\$ 19 million annually to generate more than 100 gigawatt-hours per year (an average of US\$ 0.19 per kilowatt-hour).*

Bujagali Hydro Project

At the request of the Government of Uganda, the AES Corporation, through its privately owned and operated project company, AES Nile Power, is planning to build and operate a US\$ 500 million (est.), 200 MW run-of-the-river power plant on a Build-Own-Operate-Transfer (BOOT) basis, at Bujagali Falls on the Victoria Nile, near Jinja, in southeastern Uganda. AES will also

construct a 100 km transmission line of 220 kv and 132 kv transmission lines and two substations. AES Nile Power will sell electricity to the Uganda Electricity Transmission Company Limited under a 30-year Power Purchase Agreement (PPA). The project represents the single largest private investment in East Africa's history.

3.3 New and Renewable Energy Sources

A renewable energy resource is one whose stock is not fixed and can be increased as well as decreased. The interest in new and renewable energy sources is relatively recent. The combined contribution of the new and renewable sources of energy to the total energy consumed in Uganda is estimated at 1 per cent. Except for biogas, these sources of energy have not been sufficiently explored to determine the best methods of harvesting them at sustainable levels. The new and renewable energy sources include - wind, biogas, solar, geothermal, liquid fuels and peat.

□ Wind Energy

The average wind speed in Uganda is about 3 metres per second. In flatter areas especially around Lake Victoria and the Karamoja region as well as tops of hilly areas, the speed may go as high as 6 meters per second and above. This wind regime is good enough to support wind technology applications in the country. However, these wind speeds have been recorded at low heights for purposes of predicting weather. No measurements have been made at appropriate heights (over 10 m) for wind turbine design. A programme to that effect is being initiated under assistance from the African Development Bank and several private sector initiatives.

□ Biomass

Biomass (firewood, charcoal and crop residues) plays a very significant role in Uganda's energy supply. It constitutes over 90% of total energy consumption in the country. It provides almost all the energy used to meet basic needs of cooking and water heating in rural and most urban households, institutions and commercial buildings. Biomass is the main source of energy for rural industries. Trading in biomass energy, especially charcoal contributes to the economy in terms of rural incomes, tax revenue and employment. It saves foreign exchange, employs 20,000 people and generates US\$ 36 billion (US\$ 20m) per year in rural incomes. Fuel wood requirements have contributed to the degradation of forests as wood reserves are depleted at a

rapid rate in many regions. Charcoal consumption increases at a rate close to that of urban population (6% per annum). Charcoal is generally produced on non-state land.

Biomass (bagasse from sugar processing industry) is also used to produce electricity and steam (cogeneration).

Most of the traditional energy technologies (wood and charcoal stoves and charcoal production kilns) currently used in Uganda are inefficient. Several initiatives to conserve biomass resources have been undertaken by Government and the private sector, including NGOs. They include the promotion of improved stoves, as well as afforestation. However, the impact of these efforts is still limited.

□ **Solar Energy**

Uganda is endowed with plenty of sunshine giving solar radiation of about 4-5 kWh/m²/day. This level of insolation is quite favorable for all solar technology applications. Solar energy applications in Uganda include solar photovoltaic (PV), water heating, cooling and crop drying.

PV systems are generally required for applications where modest power needs exist mainly in areas that are not served by the grid. They provide power for lighting, telecommunications, vaccine and blood refrigeration, and for playing radio and television in such areas. This technology has also proven to be very successful in providing energy services to very inaccessible areas such as on islands and mountainous areas where the national grid cannot be expected to extend its services in the foreseeable future.

Government is currently implementing a solar PV pilot project through a financing mechanism that makes it possible for both PV consumers and vendors to obtain credit from banks for solar rural electrification. The application of solar water heating is still very limited.

□ **Geothermal Energy**

In addition to power generation, geothermal energy could be used in Uganda to substitute for increasingly scarce wood to dry fish, tea, and crops, cure tobacco and process sugar. Geothermal is a potential alternative to hydro, fossil fuel, and biomass energy resources.

The potential for geothermal power is evident from the hot springs found in the Western region of the country around the shores of lake Albert with temperatures ranging from 50°C to 100°C. The

estimated national potential is 450 MW. There are three potential geothermal fields: - the Katwe volcanic field to the south; the Buranga field at the foothills of Rwenzori mountains and; the Kibiro field in the northern part of the Rift Valley near Lake Albert. Of these three sites, the Katwe field is the most promising as well as famous for its explosive craters and saline lakes. In addition, the Katwe field is located 35 km from the terminus of a 132 KV transmission line at Kasese. Chemical studies done in the past indicated that the Katwe subsurface temperature might be above 200⁰C. A geothermal power plant can supply energy to the not operational salt mining facility at Katwe. The other two fields are located in sparsely populated and remote areas, with some potential for local consumption.

Government has evolved a Geothermal Development Plan for the period 2003-2008. Under this plan, geochemical investigation is to be completed under the ongoing project “Isotope Hydrology for Exploring Geothermal Resources” funded by the International Atomic Energy Agency (IAEA) and Government. The project is carrying out hydrological studies to delineate flow characteristics of surface, ground and geothermal waters in the three geothermal prospects of Katwe, Buranga and Kibiro. The results of this project and the geophysical surveys, together with the already established model from geological and geochemical studies will enable the establishment of an integrated model that will be the basis for citing the first exploration wells.

□ **Small (mini and micro) Hydropower**

The country has numerous mini- and micro-hydropower sites that can be developed to supply isolated areas or feed into the national grid. A study has been carried out on nine potential sites to rank them for development.

3.4 Atomic Energy Sub-sector

Atomic energy use in Uganda is limited and is applied mainly in the agricultural and the health sectors. Atomic energy uses must be regulated in order to protect the public and the environment from dangers arising out of improper practices and uses of ionising radiation.

Atomic energy matters are regulated by the Atomic Energy Decree No.12 of 1972. The Decree established an Atomic Energy Control Board. However, the Board was never constituted.

4.0 LINKAGES IN THE SECTOR

The energy sector facilitates all the other sectors of the economy. These include among others: - health, education, banking, manufacturing, agriculture, communications, and transport. It is therefore at the heart of the economy and partly determines the costs of production in all the other sectors. The energy sector also offers substantial export opportunities to neighboring countries.

5.0 UGANDA’S COMPETITIVE ADVANTAGE IN THE ENERGY SECTOR

Uganda is endowed with water resources in the form of direct precipitation, ground water, runoff, and surface water. Three of the lakes in the country are shared with other riparian states, and each of the eight major rivers have an estimated length in excess of 100 km with varying discharge rates. The ground water resources comprise of five aquifer systems. Uganda has tremendous hydroelectric potential, particularly along the Victoria and Albert Niles.

- Uganda is also strategically located to export power to its neighbors and has been selected by ESKOM of South Africa as its regional Headquarters.

□ Investment Protection

- Uganda’s constitution guarantees the right to property;
- MIGA coverage: Uganda became a member of the Multilateral Investment Guarantee Agency (MIGA) in 1992. Under this agency, foreign investors can insure their investments in Uganda against a wide range of non-commercial risks including expropriation, currency transfers, and breach of contract and civil strife. Foreign investors can apply for MIGA through UIA;
- Overseas Investment Insurance Scheme – The scheme provides insurance cover for UK companies against the perceived political risks of investing in foreign markets;
- Overseas Private Investment Corporation (OPIC) – An agreement signed in 1998 with the above US agency seeks to guarantee American Investment in Uganda; and
- Uganda has also signed bilateral investment protection agreements with a number of other countries.

6.0 POTENTIAL AND EXISTING MARKETS

Uganda's population is estimated at 24.7 million people and is growing at a rate of 2.5 per cent per annum. This is a sizeable market to depend on. The Ugandan economy has been one of the fastest growing economies in Africa, with an average growth rate of 6.4 per cent for the last 8 years. This represents an increase in the potential market for energy of 2 per cent per month. The Great Lakes region (an area to which Uganda can export power) has a population of over 150 million people. Besides there is the common market for Eastern and Southern Africa States (COMESA) which is Africa's single regional economic grouping with an estimated population of over 300 million in 20 countries.

7.0 INVESTMENT OPPORTUNITIES

Whereas Uganda has plentiful hydropower, solar and biomass resource potential, it has one of the world's lowest levels of electricity development. Considerable scope exists for accelerating electrification to meet the growing demand especially in the rural areas through off-grid electrification. Investment opportunities exist for developing mini hydropower dams, solar photovoltaic systems, biomass and co-generation by sugar and tea factories to provide electricity. The potential for private sector participation in the provision of these services is quite significant. The following investment opportunities exist in the energy sector: -

- Rural Electrification;
- Exploration of petroleum;
- Generation and distribution of electricity;
- Promotion and development of new and renewable energy resources;

Table 8 shows the country's potential for medium, small and micro hydropower stations.

Table 8 Uganda; Locations of Micro, Small and Medium Hydropower Potential

Micro		
Site	River	Estimated Capacity (MW)
Arua	Anyau	0.3
Heissesero	Bunyonyi	0.3
Kitumba	Nyakabuguka	0.2
Mpanga	Mpanga	0.4
Nyakabale	Nyakabale	0.1
Moyo	Ataki	0.2
Kisiizi	Kisiizi	0.2
Small		
Site	River	Estimated Capacity (MW)
Lake Bunyonyi	Bunyonyi	1.0
Nsongezi	Kagera	2.0
Paidha A	Nyagak	1.0
Paidha B	Nyagak	2.0
Ishasha A (West)	Ishasha	2.4
Ishasha B	Ishasha	3.6
Nyamabuye A	Kaku	1.5
Nyamabuye B	Kaku	0.7
Maziga Gorge	Maziba	0.5
Kaka	Ruimi	1.5
Mbarara	Muzizi	0.7
Sogahi A	Sogahi	2.7
Sogahi B	Sogahi	3.3
Medium		
Site	River	Estimated Capacity (MW)
Muzizi	Muzizi	10
Bogoye	Mubuku	7.5
Nengo Bridge	Ntungu	12.0

Source: Ministry of Energy and Minerals

7.1 Investment Promotion Facilitation And Aftercare Services

The Uganda Investment Authority (UIA) is a Government body to promote and facilitate investment in Uganda. The UIA can help investors:

- Obtain necessary information on investment in Uganda.
- Implement their project ideas through professional advice and assistance in locating relevant project support services.
- Issue the necessary investment licence and helping investors to secure secondary licenses and approvals e.g. work permits, trading licences etc.
- Arranging contacts for an investor and organizing itineraries for visiting foreign missions within the country.
- Assisting investors in seeking joint venture partners and linking with possible funding agencies.

7.2 The Incentive Regime

Uganda's fiscal incentive package provides for generous capital recovery terms, particularly for investors whose projects entail significant investment in plant and machinery and whose investments are medium or long term. The incentive package includes: -

Category 1 – Initial Investment Allowances which are deductible once from the company's income. Initial allowances are based on the value of plant and machinery: -

Kampala, Entebbe, Namanve, Jinja & Njeru areas	50%
Outside Kampala, Entebbe, Namanve & Jinja area	75%
Start-up costs	25%
Scientific Research expenditure	100%
Training expenditure	100%
Industrial buildings	20%

Category 2 – Deductible Annual Allowances

Depreciable assets specified in 4 classes under declining balance method: -

Class 1	Computers & Data handling equipment	45%
Class 2	Automobiles, Construction and Earth moving equipment	35%
Class 3	Buses, Goods Vehicles, Tractors, Trailers, Plant & Machinery for farming, manufacturing and mining	30%
Class 4	Cars, Locomotives, Vessels, Office furniture, fixtures etc.	20%

Category 3 – Other Annual Depreciation Allowances

Industrial Buildings, Hotels & Hospitals	5%
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Assessed losses arising out of company operations including the loss from the investment allowances can be carried forward indefinitely. In addition, Uganda's corporation tax rate of 30% is one of the lowest in Africa. All plant and machinery is imported duty and tax-free. Investors who register as VAT Traders are allowed VAT refunds on all construction materials used on their projects within a period not exceeding 4 years of project implementation. Further more, there are no taxes on all exports from Uganda. Exporters are also allowed duty draw back facilities on all taxes paid on raw materials used for the manufacture of exports. Uganda also has a fully liberalized foreign exchange regime with no restrictions on the movement of capital. 100% ownership of projects by foreign investors is allowed.

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Uganda Energy Assessment (1996), Joint UNDP/World Bank Energy Sector Management Assistance Program (ESMAP), Ministry of natural Resources.

Appendix 1: Key Contacts in Uganda

The Permanent Secretary,
Ministry of Energy and Mineral Development,
P. O. Box 7270, KAMPALA.
Tel: 256-41-234733, Fax: 256-41-234732
Email: psmemd@energy.co.ug
Website www.energyandminerals.go.ug

The Executive Director
Uganda Investment Authority
Plot 28, Kampala Road
P.O. Box 7418 Kampala.
Tel: 251562/5, 234109 Fax: 342903
Email: info@ugandainvest.com
Website www.ugandainvest.com

The Coordinator, Geothermal Exploration
Geological Survey and Mines Department
P. O. Box 9, Entebbe, Uganda
Tel: 256 41 320656/118/559
Fax: 256 41 320364
gsurvey@starcom.co.ug

AES Nile Power
Plot 37 Yusuf Lule Road
P.O. Box 24401 Kampala Tel 349235/346983 Fax 346982

Pakwach Power Plant Ltd
Plot 2 Parliament Avenue, Jumbo House
Box 311 Kampala Tel 346576

Solar Energy for Africa
Plot 40 Bombo Road
P. O. Box 4155 Kampala. Tel 245538

The Commissioner for Energy,
Ministry of Energy and Mineral Development
P. O. Box 7270, KAMPALA. Tel. 235889, 348618, 257863 Fax. 230220, 232347

The Commissioner
Petroleum Exploration & Production Department
P. O. Box 9, ENTEBBE Tel. 256-41-320714 Fax. 256-41-320437 Email:
pepdebb@africaonline.co.ug

Appendix 2: Uganda's Electricity Tariffs

Electricity Tariffs

Code 10.1: Low voltage Supply for Small General Service

- a) Retail tariff the first 30 kWh
- b) Retail tariff above 30 kWh
- c) Fixed monthly fee per customer

Rates (Ushs.)

50.00 per unit
168.00 per unit
1,000.00 per month

Code 10.2: Low voltage Supply for Small General Service

- a) Retail tariff unit charge per kWh
- b) Fixed monthly fee per customer

168.00 per unit
1,000.00 per month

Code 20: Low voltage supply for medium-scale industries

- a) Retail tariff unit charge per kWh
- b) Fixed monthly fee per customer
- c) Maximum demand charge per KVA

152.40 per unit
10,000.00 per month
5,000.00 per month

Code 22: Off peak low voltage supply for medium-scale industries

Available for consumers on Tariff Code 3.1, for supplies taken and separately metered, between 11:00 p.m. and 6:00 a.m. daily.

- a) Retail tariff unit charge per kWh
- b) fixed monthly fee per customer
- c) Maximum demand charge per KVA

80.60 per nit
10,000.00 per month
5,000.00 per month

Code 30: High voltage supply to large industrial users

- a) Retail tariff unit charge per kWh
- b) Fixed monthly fee per customer per month
- c) Maximum demand charge up to 2000 KVA per KVA
- d) Maximum demand charge above 200 KVA per KVA

93.50 per unit
15,000.00 per month
3,300.00 per month
3,000.00 per month

Code 32: Off-peak high voltage supply to large industrial users

Available for customers of tariff code 4.1 for supplies taken and separately metered between 11:00 p.m. and 6:00 a.m. daily

- a) Retail tariff unit charge per kWh
- b) Fixed monthly fee per customer per month
- c) Maximum demand charge up to 2000 KVA per KVA/month
- d) Maximum demand charge above 2000 KVA per KVA/month

57.4.00 per unit
15,000.00 per month
3,300.00 per month
3,000 per month

Code 50: Street Lighting

- a) Retail tariff unit charge per kWh
- b) Fixed monthly fee per customer per month

153.00 per unit
4,000.00 per month