

# ALTERNATIVE ENERGY STRATEGY FOR UGANDA

## A Civil Society Perspective



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## **Preface**

Many developments in a nation depend on availability of energy, though not all entirely. In Uganda, there is no doubt about the role of energy in the development in the present times, but also, there is no doubt about the potential of numerous energy sources where this very necessary energy could be harnessed. The challenge is however, that much focus has been put to large hydro electricity dams as the viable source of energy, paying little or no attention to various potential alternative renewable sources like solar, geothermal, wind, small dams and biogas among others. It is against this background that NAPE, with financial support from Both ENDS, found it necessary to explore more about the alternative energy options in Uganda.

This document therefore, analyses the energy gap left by dependence on Large Dams and Centralized grids in Uganda. It highlights the untapped alternative energy potentials, suggests and recommends possible considerations for useful sustainable exploitation and implores those interested in investing in the energy sector to take up the challenge for a better energized Uganda where the rural electrification and energy for the poor is a priority. The government holds the mantle for the development of this nation, but the more it realizes that it seriously needs the involvement of the stakeholders the better will be its plans. This alternative renewable energy strategy is, but one of the views from energy stakeholders that NAPE has helped to bring to the attention of the government of Uganda and energy proponents for consideration in developing the energy sector for a better and energized Uganda.

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Frank Muramuzi

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## **Executive Summary:**

Ugandan energy sector depends on large dams as the main source of hydropower. Uganda has a unique potential of alternative renewable energy including solar, geothermal, mini hydros, biogas, peat and wind which have not been developed. On the other hand Uganda's main source of energy is biomass which accounts for over 90% of the energy used in form of firewood and charcoal. There is thus dire need to put in place appropriate policy and enabling environment for alternative renewable energy development and promotion in Uganda. A Uganda energy sector in which alternative energy sources are emphasized and developed to ensure rural electrification, where Participation by rural communities, women, youth and other stakeholders is very necessary. With this potential of alternative renewable energy options fully exploited, efficient energy utilization, and Rural electrification with Affordable renewable energy is possible.

The energy master plan of 1995 stressed development of 12 big dams on the river Nile. These included Bujagali, Karuma, Isimba, Ayago North, Ayago south, Murchison falls dam among others. The plan, which has not been reviewed, completely ignores alternative energy sources and is largely dependent on external donor financing.

A number of regulatory instruments have been developed to implement the plan. They include: Electricity Regulatory Authority (ERA), and the electricity act 1999 which is pro large dams.

Uganda energy sector, for the execution of the plan, heavily depends on external financing. The main energy sector financiers for Uganda are the World Bank (WB), The African Development Bank (AfDB) and the European Investment Bank (EIB). Virtually all the funding goes to large dam infrastructure development such as Kiira and Bujagali dams.

Uganda since 2007, with its 'Renewable energy policy, follows an alternative energy policy geared towards developing its potential of alternative energy resources. Uganda renewable energy potentials include; mini-hydro, solar, biomass, geothermal, peat and wind. Overwhelmingly, the populations depend on biomass in form of charcoal and firewood.

The following policy and regulatory initiatives are recommended by NAPE to accelerate alternative renewable and decentralized generation investment in Uganda, thereby rendering further investment in large hydro dams and diesel fired plants unnecessary and obsolete in the near future. They include;

- i. Promotion of efficient biomass energy use technologies.
- ii. Participation of directly affected communities and adherence to World Commission on Dams guidelines in the development of large dams; By meeting and passing the WCD standards test, dams will be in the renewable energy category, when they have met the social and environmental safeguards requirements.
- iii. Introduction of zero import duties for all local decentralized generation technologies and equipment.
- iv. Introduction of customer financing programs to allow rural communities far from grids to acquire renewable alternative energy like solar units and biomass energy efficient technologies there by reducing dependence on the expensive central grid energy.
- v. Open the energy market to private decentralized generation,
- vi. Give all power generators non-discriminatory access to local distribution grids and allow independent distribution for those far away from the grids,
- vii. Provide investors with stability and price signals they need where a transparent and explicit mechanism for tariff setting and cost recovery are clearly indicated.
- viii. Reduce the costly many different private companies (Eskom, Uganda Electricity Generation Company Limited (UEGCL), Uganda Electricity Transmission Company Limited (UETCL), Uganda Electricity Distribution Company Limited (UEDCL) and umeme) which are too many for just the energy sector and increase the tariff burden to the electricity users. Before the coming in of so many players in the energy sector, Uganda Electricity Board (UEB), a governmental parastatal, provided what the stakeholders consider to have been a more efficient service delivery as opposed to the very poor energy services now being delivered by multiple companies. Besides, the cost of electricity was more affordable than now when there are many service providers.
- ix. Encourage, promote and support community, individual and business efficient energy use initiatives.

## 1. Introduction

### 1.1. Socio economic data and poverty outlook

According to the International Monetary Fund IMF,- (2011) World Economic Outlook data estimates and projections based on calculations, Uganda has a Growth Domestic Product (GDP) growth of 6.7 %. The economy is dominated by the following economic sectors: remittances from Ugandans working abroad, tourism, agriculture and fisheries. Petroleum is coming into play as vast commercial fields of oil have been explored in western Uganda and the mining and refining of oil is projected to begin in two years time.

The proportion of people living below poverty line stands at 25 % in 2009/10, (World Bank Report 2010). Most of the poor are situated in rural areas. Rural people are still the majority in Uganda with about 88% of the population residing in rural areas, where traditional biomass (mainly wood fuel) has remained the leading source of energy (both for cooking, and at times for lighting). Electrification coverage in rural Uganda is still very poor with less than 1% of the rural population having access to the national grid.

The country has a deficit of US\$ 2.0 billion. Its debt amount consists out of 13.8 percent of GDP (Joint IMF/World Bank Debt Sustainability Analysis, April 2010) Within the existing economic world system Uganda is dependent upon finance provided by international agencies, such as the World Bank, African Development Bank and EIB, to open new investments especially in the energy sector. The same Banks already have made investments in the energy sector of the country: the Bujagali dam, with the prospect that more hydro projects might follow.

### 1.2. Actual energy needs, type of available energy, the installed capacity and energy services

Uganda is endowed with a diverse array of energy resources that include large hydro, small hydro, geothermal, biogas, biomass, biomass based cogeneration, wind, solar and more recently petroleum being explored in the rift valley area of the country. If harnessed properly these resources could satisfy the countries and the region's energy needs and stimulate faster economic development. The total energy used in Uganda is derived from different energy sources. Generally the Uganda energy mix comprises of biomass (92%), petroleum (6%) and about 2% or less of hydro power electricity.

Energy Source	Estimated Electrical Potential (MW)
Hydro (mainly on the Nile)	2,000
Mini-hydro	200
Solar	200
Biomass	1,650
Geothermal	450
Peat	800
Wind	-
Total	5,300

Source: *The renewable Energy Policy for Uganda, November 2007.*

### Table 1. The Renewable Energy Power Potential

In spite of the vast energy potential, Uganda is facing an acute power supply shortage which has affected all the sectors of the economy. The rate of growth of demand for electricity outstrips the rate of growth of generation capacity and distribution of electric power. Currently, Uganda imports electricity from Rwanda which supplies the town of Kisoro which is near the Rwanda electricity distribution lines. Uganda also exports electricity to Kenya and Rwanda.. By 2007, the demand for electricity was over 260 MW during day, rising to 350 MW in the evening. The power shortage adversely impacts the industrial and commercial sectors. As a result, the GDP, which was expected to grow at 6 - 6.5%, may keep at 6% according to *Global Finance of report March 2011.*

Electricity is generated from hydropower, cogeneration from biomass, and thermal power by both private and public actors. The current installed capacity is 595.84 MW. The large dam hydropower generation accounts for 380 MW. Of which 180 MW is from Nalubaale, and 200 MW is from Kiira. The mini hydropower plants account for 28.84 MW. The cogeneration contributes to the grid 17MW from biomass by Kakira sugar factory (12MW) and Kinyara sugar works (5MW). Despite installed capacity, actual hydropower generation varies between 140 and 200MW. Installed capacity is expected to rise to about 802 MW in 2011 with full commissioning of Bujagali hydropower. (*National Development Plan for Uganda 2010/11 – 2014/15.*)

Installed capacity and actual generation of the power connected to the National grid			
Type of power	Installed capacity	Actual generation	Remarks
Hydro power	409MW	409 - 200MW	180MW (Nalubaale HPP)
			200MW (Kiira HPP)
			28.84 (MINI-HPP)
Biomass power potential	26MW (17 MW connected to grid)	26MW (17 MW connected to grid)	Kakira (18MW) but to grid 12mw. Kinyara 8MW but to grid 5MW
Thermal power	170MW	170MW	Namanve 50MW, Mutundwe 50MW, Kiira 50MW and Tororo 20MW.

Source: National development plan 2010/11 – 2014/15

In addition thermal generation which accounts for 170MW are generated from Namanve, Kiira, Tororo, and Mutundwe thermal plants. This means that diesel-powered thermal generators contribute to over 60% of Uganda's power, a situation that has contributed to high power prices, thereby escalating the costs of doing business.

Uganda imports all its petroleum products and there is, as yet, no production in the country; although some local production is expected to begin when a refinery is established. Imports come primarily through Kenya (85%) and Tanzania (15%) via trucks. The main oil route is from the port of Mombasa via a pipe line to Eldoret in western Kenya and then by truck across the border into Uganda. The latest cabinet decision is to give an incentive of 150 shs less on the money taxed per litre for importers using the Dar salaam (Tanzania) route to bring petroleum to Uganda. (*Routers 16<sup>th</sup> Sept. 2011*), However, petroleum imports form a drop in the ocean.

In order to meet the energy demand, Eskom which runs the tow twin dams at Owen falls,- the Nalubaale and the Kiira dams, has in some cases been tempted to release more water so as to produce more power. However, the Directorate of Water Development has from time to time directed Eskom to revise its water release levels downwards from 1,000 to 700 cubic meters. This has caused a doubling of the number of power cuts, through reduced hydropower generation despite heavy rains across the country. As a result the Uganda Electricity Transmission Company Limited (UETCL) directed power distributor Umeme to introduce two new groups of load shedding to manage an expected deficit of at least 100 Mega Watts (MW) of power. Load shedding of electricity has increased tremendously. Umeme was expected to respond to the directive starting immediately to align its operations with the current shortfall in the water levels of Lake Victoria (*Daily Monitor 8<sup>th</sup> Sept. 2011*). The shortfall in the water has been due to over release of water from the lake Victoria over and above the agreed curve. This reality has already hit hard. For example, the patients in hospitals are reported to have been asked to contribute money for alternative energy as result of rampant load-shedding. Patients in Arua hospital have been asked to contribute Ushs. 1000 (about ½ a dollar) to buy paraffin for lighting in the hospital (*Daily Monitor Sept. 19<sup>th</sup> 2011*)

### 1.3. Potential new energy sources

#### 1.3.1. Mini-Hydropower

More than 60 mini-hydro sites with a total potential of about 210 MW have been identified through different studies in Uganda. Some of the sites can be developed for isolated grids. Other hydro power sites can be developed as energy supply to the central grid. Mini hydro are considered as alternative for large dams and as renewable because their damage to environment is minimal, they are located in rural areas where electricity deficit is high, and so would not need to transmitted long distances from the point of generation, and in this way they are more economical than large dams. To date, Uganda boasts of installed capacity 28.8 MW generated from small hydro in some rural areas. (*The national Development Plan for Uganda 2010/11 – 2014/15*). However, recent additions, or soon to be added is the capacity of 5.5 MW from Ishaha, 9 MW from Buseruka, 10 MW from Mpanga and 10 MW from Bugoye.

#### 1.3.2. Solar energy

Much as solar may not be a direct alternative for large dams, it is implied, in that large dams are partly being promoted to provide rural electrification. If solar which highly flexible in terms of locating it is prioritised in addition to mini decentralised hydros, it will directly reduce pressure from rural areas dependency on the central grid which is supplied by large dams, and therefore large dams with their destructive nature will not be necessary

Uganda receives 2500 – 3200 hours of sunshine per year and has a mean solar radiation of 5.1 kWh /m<sup>2</sup> per day on a horizontal surface. The average solar flux in some parts of the country based on 24 hours can be as high as 300W/m<sup>2</sup> or more. This level of insolation is favourable for the application of a number of technologies that include:

- I. Solar water heating; and
- II. Solar photovoltaic systems for supply of basic electricity in rural institutions and households as well as

areas not connected to the grid.

Unfortunately, Uganda so far does not make much use of this available energy potential. The total new installed photovoltaic capacity annually is estimated at 200 kWp for households, institutions and commercial use.

### **1.3.3. Wind Energy**

The average wind speed in Uganda is about 3 meters per second although speeds of up to 6 m/s have been recorded in flatter areas especially around the Lake Victoria and the Karamoja region as well as on hill tops. A study conducted by *Pereira da Silva et al* 1999 noted that the analysis that have been conducted in the country indicate that there are areas where wind speeds could support power generation. But on the whole, wind energy has not been widely used, possibly because of the limited awareness on the way wind energy could be used to produce electricity (*Development renewable- Uganda country study 2006*). Or because the government has not given it priority so far. So far the country has installed a potential of wind mills for energy generation.

### **1.3.4. Biomass Energy**

Biomass as a source of electricity at small scale has not been explored in the African region except in South Africa; Biomass resources which include firewood, charcoal and crop residues play a very significant role in Uganda's energy supply, constituting over 90% of total energy consumption. Biomass energy provides almost all the energy used to meet basic needs of cooking and water heating in rural and most of the urban households, institutions and commercial building. Biomass in forms of firewood and charcoal is the main source of energy for rural based industries. Biomass saves foreign exchange and employs up to 20,000 people and generates Ushs. 36 billion (US\$ 20m) per year in rural incomes in Uganda. The daily per capita consumption of woody biomass for energy is about 4kg (NEMA 2000/2001). The contribution of forestry to national energy demands is mostly expressed through woody biomass use by households and institutions for heating purposes.

In 1994, charcoal production utilized 6 million m<sup>3</sup> of round wood. This increased to 11 million m<sup>3</sup> in 2007<sup>34</sup>. In addition, the national consumption of \_firewood was estimated at 32.8 million m<sup>3</sup> of woody biomass energy annually<sup>35</sup>. The National Biomass Study (2003) indicates that 73 per cent of the districts in Uganda are experiencing a shortage of accessible woody biomass for fuel. On average, the distance travelled to collect \_firewood has increased from 0.73 km in 2000 to more than 1 km in 2007 (MWE 2007). Unfortunately firewood and charcoal have been responsible for the recession of forests and woodlands in Uganda, making a way for desertification. Also mass forest destruction in Kalangala Islands seen as land grab by BIDCO a palm oil tree planting firm has worsened the situation.

### **1.3.5. Geothermal energy**

Uganda, if it would extract the 250 MW, now projected to be generated by the Bujagali dam, through geothermal energy it would cost 65,625,000 US\$ instead of the present cost of 1bn dollars for the development of the dam. Overall, Uganda's geothermal potential is estimated at 440 MW. (*Development renewables- Uganda country study 2006*). Currently the countries installed capacity is 170 MW.

Geothermal power has numerous advantages over other sources of power ie it is not affected by drought and climate variability, it has the highest availability factor at about 95%, it is green energy with no adverse effects on the environment. *Maurice Odiambo 2012, social and environmental impacts and transparency assessment of AfDB Energy projects*. It is indigenous and would be readily available in unlike fossil thermal energy that relies on fuel imports. Despite these advantages, the development of geothermal has not received the attention it requires to contribute its part of solution to the energy woes of Uganda.

### **1.3.6. Biogas Energy**

Biogas development which mainly uses animal manure to produce energy has so far been spread over five districts across Uganda. These include Mpigi, Kabarole, Iganga, Tororo and Mbale. Some ten biogas plants have been installed in each district, which brings the total number installed to 50. This is an achievement. In spite of that 50 plants in 5 districts is still a small number. The other forty districts in the country have not been availed of this service. (*Kamese, 2004*).

All efforts in the promotion of biogas have either been undertaken by church institutions or civil society organizations. If the government develops a comprehensive plan for biogas promotion, results will be much more than the actual. Despite the high initial capital input which many of the poor cannot afford, the long term benefits of biogas could be huge.

#### **1.4. Energy efficiency**

Energy Efficiency is aimed at ensuring economical utilization of energy in all sectors of the economy, including industry, commercial buildings, institutions, households, transport and agriculture. Efficient use of energy is the cheapest and quickest way to alleviate the foreign exchange burden of energy imports, reduce the capital constraints of building new power stations and extend domestic energy supplies. Up to now, activities on energy conservation have been limited to preliminary energy audits done by the Ministry of Energy and Mineral Development in industries and commercial buildings (hotels) as well as efforts to increase awareness among all stakeholders. To date, Uganda is losing up lot of its energy in transmission, poor facilities and theft. Loss in transmission is estimated at 40%. A number of measures are being taken to reduce losses including: energy audits, to establish areas for improvements in energy use, refurbishment of grid network, installation of prepaid meters and other actions to curb illegal use of electricity. (The *national Development Plan for Uganda 2010/11 – 2014/15*).

However pre-dominance of old fleet of vehicles that are poorly maintained that are energy inefficient, dominate Uganda's transport sector, resulting in increased pollution. Poor transport infrastructure also adds to this misery. Narrow as well as potholed streets in cities like Kampala lead to traffic jam. A lot of fuel is wasted in traffic jams, which also adds to pollution. Inadequate mass transit system, results in increased traffic congestion during peak hours and energy consumption per passenger.

In households, low efficiency of technologies in use, including wood fuel stoves, lights and other appliances have continued. Insufficient incentives to introduce fuel/technology substitution, e.g. electricity for kerosene and wood fuel energy saving stove, for wood fuel, solar water heaters for electric water heaters and wood fuel, fluorescent lamps for incandescent lamps has worsened the situation. Lack of information about improved energy technologies and efficient practices is rampant. Although the Uganda government has initiated energy efficiency promotion activities, for example week 19<sup>th</sup> – 24<sup>th</sup> September has been gazetted in which it will be giving tips in the media on how energy can be use efficiently. (*Daily Monitor 19<sup>th</sup> September 2012*), a good initiative and should continue with necessary incentives.

#### **1.5. Country's services, energy sector institutions and policy**

Before the reforms in 1999, the Uganda Electricity Board (UEB) held a monopoly in electricity generation, transmission, distribution and supply within Uganda and neighboring countries in the region. UEB has now been divided into three independent companies namely the Uganda Electricity Generation Company Limited (UEGCL), Uganda Electricity Transmission Company Limited (UETCL) and the Uganda Electricity Distribution Company Limited (UEDCL) each responsible for one of the three core responsibilities in the electricity sector of generation, transmission and distribution respectively. These have only increased the number of people employed in the energy sector, which increases the cost of electricity without improving the services delivery to the energy users. UETCL mans the national grid. The Rural Electrification Authority (REA) is charged with making sure that poor rural people have access to energy from the central grid. An independent regulator, the Uganda Electricity Regulatory Authority (ERA) has been put in place charged with the responsibility of regulating power generation, transmission and distribution among other responsibilities. Also, under UEDCL, UMEME, another company is subcontracted to oversee and collect energy tariffs from the energy users. To the dismay of the energy users, UMEME has kept on increasing tariffs, the most recent (2012) being 50% increase and ERA has not challenged increments nor consulted the stakeholders, even after the 2009 Salim Saleh commission of enquiry into electricity irregularities a lot of resources mismanagement and recommended no tariff increase were necessary. Of recent umeme, UEDCL, ERA and the Attorney general were taken to court on matters relating to high tariff charges among others. What is needed is a functional Electricity tribunal where complainants would take their complaints and their issues are properly and fairly handled. The case is still in court.

#### **1.6. Government's Policy Vision for Renewable Energy**

Uganda government's 2007 policy vision for energy is to increase the use of renewable energy, from the current 4% to 61% of the total energy consumption by the year 2017. This is a change in policy stance which was largely hydro backed only to a renewable energy based. Overall, the policy is still bent towards encouraging hydro power generation than other alternative renewable energies and their distribution. In 1999, the government did not promote renewable energy. The policy now encourages the development of geothermal and wind energy. Mainstreaming of poverty eradication, equitable distribution and gender issues in renewable energy strategies is needed.

According to the policy 2001, the avoided cost principle will be used for determining feed in tariffs. It involves Waiving taxes on solar equipment and installations. It promotes liberalization of power generation but not of the distribution because the government wants energy distributed through a central grid. Public-private partnerships form the basic mechanism for renewable energy investments by private companies. (*Energy policy for Uganda*

2002). Avoided costs can be used to evaluate the benefits of resource alternatives on the supply side, including leak-detection and repair programs. Avoided costs also can be used to evaluate complex management issues, such as the potential benefits of regionalization through interconnection, partnerships, and mergers with other utilities. Such evaluations are well within the spirit of comprehensive and integrated resource planning (Beecher, 1996). Feed-In Tariffs (also known as FITs) are the electricity part of what some people call Clean Energy Cash back, a scheme that pays people for creating their own "green electricity"

### **1.7. Available finance to meet energy needs**

The Government of Uganda has set up what is called an energy fund which is meant for the development of energy projects mainly dams. However, there are public concerns over where the government gets the capital for this fund. According to president Museveni's earlier indications, that he gave around 2007 -2008, government would invest public money like the National Social Security Fund (NSSF) money in large dams. Although the workers who contribute to this fund, have not been consulted on this decision. This If transparency and accountability principles were upheld, and if the fund was targeting alternative renewable energy options, it would be a good place of EIB to put money.

### **1.8. Overview of International/institutional financier investments in the energy sector**

As mentioned before, Uganda's energy sector is mainly dependent on external financial sources. The government of Uganda has been getting loans for funding energy project developments from financial institutions like African Development Bank (AfDB), World Bank, and European Investment Bank (EIB). Although according to government the upcoming oil industry is expected to fund National development especially the areas of energy and infrastructure, it cannot replace the role played by trio banks in the country's development. These three institutions have also been the source of funding for Bujagali dam. In order to make meaningful contribution to Uganda's energy needs, it is important that further financing for the energy sector in Uganda, should consider proposals in this document seriously.

### **1.9. Public concerns**

There is public concern that some projects funded do not have the value they were forecasted that they would have, yet they lay a burden on the tax payer. The banks have been challenged upon their support for the energy projects which fail the banks social and environmental safeguard policies, there by abusing the country's citizens' human rights and increasing the tax payer burden. The civil society is strongly urging the banks to have and follow safeguard and information disclosure policies in funding public and private-public partnership projects.

The public is concerned over over-burdening of a small energy sector with numerous energy firms which do not add much value in terms of improving electricity services in the country. The presence of multiple players in energy sector including Umeme, UEGCL, UEDCL, UECTL and Eskom have not done better service delivery than when the whole energy sector was run by Uganda Electricity Board (UEB). While the public takes the policy for renewable energy as a welcome innovation in Uganda's energy sector policies, there is concern, that it excludes participation of communities and CSOs. As well it requires that energy generated in the rural areas is first transferred to the central grid and then to the rural areas. As a consequence, there is unnecessary loss of energy in the transmission, and the to and fro flow of electricity increases costs which is a burden to the tax payer and prohibitive to the consumers. Direct supply from local grids is not catered for in the present energy policy.

The increased costs of energy, make it unaffordable to average Ugandans leading to increased electricity criminals who steal power, but still increase the burden of the genuine users. To date Ugandans have not found any backing for reasoning highly traded on Bujagali. The cost of electricity in Uganda remains unaffordable to most citizens, yet the government has kept on using taxpayers' money in power projects that hardly bring any relieve to consumers.

Only seven years ago when Uganda was still operating on power generated by the age-old Owen Falls Dam, Ugandans paid about 171 shillings for domestic power consumption. Interestingly, Ugandans have nothing to celebrate as yet about the commissioning of the 250KW Bujagali Power Dam as the cost of domestic consumption has shot to over 500 shillings per unit. This is getting terribly ridiculous, Tumusiime DK (2012). According to Kahigwa J A, (2013), a power price rise is being considered just after huge increments of 69% and 36% for large scale and domestic consumers respectively early last year. That followed a trend of tariff increments registered in the previous years. In 2005, prices increased by 24%, and in 2006, increased by 35% in June and 41% in November of the same year.

## **2. ALTERNATIVE ENERGY STRATEGY.**

**2.0** it is indeed desirable that Uganda's alternative renewable energy strategy would consider adopt the the views of the stakeholders as given hereunder and in this document for a more beneficial and sustainable energy future for Uganda.

### **2.1. Vision**

A Uganda energy sector in which alternative energy sources are emphasized and developed to ensure rural electrification, where Participation by rural communities, women, youth and elderly is guaranteed. (Community electricity) this makes these stakeholder own the project and are part of the solutions to their problems. To date rural electrification has been a top - bottom affair. With this new alternative energy strategy, communities can initiate their own efforts in rural electrification. Besides, they can learn simple technology to maintain their electric installations themselves.

### **2.2 Objectives**

- i. To effectively electrify the rural areas by encouraging communities, civil societies youth women and elderly to participate in rural electrification decision making on locating the sites and type of the best alternative renewable energy options ;
- ii. To develop the capacity of communities, CSOs, women and youth to negotiate funding for rural electricity development ( training in negotiation skills); and
- iii. To ensure that the government works with local communities, business community and CSOs to find lasting and sustainable renewable energy solutions.

### **2.3 Activities**

- i. Popularization of the Alternative energy strategy through publishing, workshops and dissemination seminars, and electronic and print media.
- ii. Training communities, CSOs and CBOs, women and youth on how to design small fundable energy projects like solar, Biogas, small hydro and wind.
- iii. Putting in place enabling policies that encourage the stakeholders to be involved in undertakings that promote sustainable energy promotion and use.
- iv. Involving the stakeholders, and the communities in renewable energy policy formulation.
- v. Removing policies that discourage stakeholders from effectively engaging in renewable energy promotion and utilization.

### **2.4 Incentives**

- i. Give the business community involved in renewable alternative energy equipment importation or manufacturing an import duty free and a tax holiday respectively.
- ii. Encourage private investment in small hydro dams investment and allow them to development of independent local distribution networks to serve the areas of their jurisdiction;
- iii. For efficiency encourage and interest energy users to off pick energy use by packaging and promoting incentive products, waive tax on energy efficiency equipment and support and fund biomass energy efficient technologies.
- iv. Subsidize consumption of electricity produced in rural areas without need to transmit to the central grid and start building local grids that are independent of the existing central grid.

### **2.5. Expected results**

- i. Communities, CSO, youth and women develop their rural electricity facilities without waiting for the others to do it for them;
- ii. People consume what they produce locally or what they have contributed to produce in terms of participation in decision making;
- iii. Coming in of other investors in alternative renewable energy to work with the local communities on their electricity issues;
- iv. Efficient energy utilization; and
- v. Rural electrification with Affordable renewable energy.

## 2.6. Proposed Regulatory framework

- i. Bottom up regulatory mechanisms involving the community grassroots;
- ii. Establish feedback mechanisms with consumers or end users of electricity to keep updated on the expectations of the stakeholders for better performance. Through these, energy criminals, (thieves can be reported).

## 2.7. Proposed finance mechanisms for the strategy

- i. Mobilize finance locally and transparently by agreeing on the best mode of collection. No unilateral decision by the national government to use public funds and savings like the National Social Security Funds for the finance of infrastructure.
- ii. Source outside funding from financial credible institutions with adherence to social and environmental safeguards but also with stakeholder information, participation and consent on where to invest their tax payers' money.

## 2.8. Consequences

### 2.8.1 Positive consequences

- i. Decentralized energy in which society will be the central players.
- ii. Cheaper locally produced and locally distributed electricity for rural communities
- iii. People will be empowered to negotiate for funding and use the money effectively to meet their rural energy needs and development.
- iv. Rural community electricity will be possible – the model is working well in South Africa. [www.globalelectricity.org/.../South-Africa\\_Mini\\_Grid\\_Assessment.p](http://www.globalelectricity.org/.../South-Africa_Mini_Grid_Assessment.p)
- v. Rural agro industries will be encouraged which will provide rural employment.
- vi. There will be reduction of Rural –Urban migration as electricity is one of the attractions for the rural youth to urban areas for what they think is "higher/ better" life.
- vii. Government will collaborate with local community's local government, local business communities / enterprises and funding agencies to develop community electricity.
- viii. Rural school children will benefit by getting light to read their books and be able to compete with those in towns.
- ix. Leisure facilities that demand electricity will be available in the rural settings and allowing people to have improved livelihoods where they live, not only in towns.
- x. Improved livelihoods and better health supported by electricity run services like health centers, running water among others.

## 2.9. Recommendations

The following policy and regulatory initiatives are recommended for Uganda's Alternative Renewable and decentralized generation investment. If adopted, they will render Uganda's dependence and further investment in large hydro dams and diesel fired plants unnecessary and obsolete in the near future.

- i. Because 88% of the Uganda population is rural, and over 90% of all Ugandans use biomass energy, and will continue to use the same for some time even if dams are being built, - **biomass energy efficient use technologies** should be promoted by the government departments responsible, but also CSOs involved in promotion of the same, should be empowered resource wise and encouraged to double their efforts and multiply biomass energy efficient use by training others for example, like in energy saving stoves
- ii. Involve the affected communities effectively and adhere to the World Commission on Dams (WCD) principles of the need to meet social and environmental impacts while developing **large hydro dams** to make them realist and viable and truly sustainable developmental projects they need to be. And, /or abandon them if they are assessed not to be. By meeting and passing the WCD standards test, they will be in the renewable energy category
- iii. The government of Uganda should remove import duties on all decentralized generation technologies and equipment
- iv. Introduce customer micro financing programs to help all households, especially the rural, interest free loans to finance household solar units and biomass energy efficient technologies that will reduce pressure of demand and dependency on the central grid energy supply. And allow them favorable period to repay the loans like 5 -7 years
- v. Open the energy market to private decentralized generation by putting in place favorable regulations to

- the investor but also protecting the electricity end users / customers
- vi. Give the local business community who are involved in renewable alternative energy equipment importation or manufacturing an import duty free and a tax holiday respectively
  - vii. Encourage private investment in small hydro dams investment and allow them to develop independent local distribution networks to serve the areas of their jurisdiction
  - viii. For efficiency encourage and interest energy users to off pick energy use by packaging and promoting incentive products (Demand Side Management), waive tax on energy efficiency equipment and support and fund biomass energy efficient technologies
  - ix. Give all power generators non-discriminatory access to local distribution grids and introduce interconnection standards that accommodate all producers. But also allow purely private distributions for those far from local grids while still maintaining national electricity costs regulations/ standards.
  - x. Provide investors and project developers with the stability and price signals they need by providing a transparent and explicit mechanism for tariff-setting and cost recovery
  - xi. Establish explicit and transparent step-by-step procedures for obtaining permits and public approval
  - xii. Make proof of community and land rights holder approval for project sitting a prerequisite to licensing by the regulatory authority
  - xiii. Reduce the costly multiple private companies in the energy sector to a few effective and efficient service deliveries, while reducing the unnecessary duplication of work and conflicts in execution of one's duties. The many unnecessary role players are a burden to the consumers as the costs of maintaining many offices are reflected in the final electricity tariffs borne by the consumer

### **3.0 Conclusion**

While Uganda has an endowment of variety of renewable energy resources, only large hydro power resources along the River Nile have been developed to provide electricity to Ugandans through the national grid. The potential for renewable energy resources which include; the mini/macro hydro power resource, solar, geothermal and biomass among others has not been fully exploited. There is great need to review the policy and regulatory frame work for Uganda so as to promote alternative renewable energy other than the socially and environmentally costly large hydro dams. If this is done the rural poor will access energy, have improved livelihoods and Uganda will develop.

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