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Knowledge network on sustainable household energy
in Southern and Eastern Africa

Scenario Analysis

Uganda

Sengendo May

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Executive summary

Uganda is a landlocked country within East Africa and its neighbouring countries include Kenya, Democratic republic of Congo, Tanzania, Rwanda and Sudan. The country has achieved economic growth of 6% (average) per annum and has gone through a stable macro-economic stability, especially over the last decade. This has been mainly through macro-economic and structural reforms. This improved economic perfomance is supported by implementation of the Poverty Eradication Action Plan to ensure that the rural and urban poor are addressed in all policy and programme initiatives. Increased investment and creation of employment are therefore key in sustaining the economic perfomance as well as empowerment of the rural and urban poor. The energy sector is key to such initiatives because it can easily be linked to the different sectors, policies and programmes that deal with agriculture, forestry, health, transport, education, water and others.

The Energy Policy for Uganda (2002) seeks to ensure that such a policy enables sustainable development through integrating economic, social and environmental objectives. In doing so, effort is taken to ensure improvement in the well being of the current genaration as well as safeguarding the future generation. Projection of what will hinder or promote the energy sector is therefore useful in the planning process of this sector. The main policy goal for the energy sector is to 'meet the energy needs of the Ugandan population for social and economic development in an environmentally sustainable manner' (Energy Policy, 2002). This policy is in line with global and regional energy policies. The Energy Policy document indicates effort made as a signitory to the United Nations Climate Change Convention (UNCCC) and how such implementation has led to planning of projects that can be supported from the Global Environment Facility and the Clean Development Mechanism. Regional cooperation is being strengthened by the estalishment of the New Partnership for Africa Development (NEPAD), where Uganda is coordinating the efforts of this partnership in East Africa. Such a partnership has oppened up opportunities for joint and integrated planning, interconnected grids and cross boarder oil pipelines for enhancing of energy trade and provision of cost-effective energy services(Energy Policy, 2002). The policy further indicates that the East African Energy Master Plan that is envisaged under NEPAD will not only deal with issues of energy trade but will also enable exchange of information and promotion of petroleum exploration.

Forestry is a major sector in Uganda that contributes to employment and livelihood of the rural women, men and children. Its contribution is further extended to agricultural production where forests are key in maintaining soil fertility and purifying water as well as regulating rain and other climate changes. Wood fuel contributes more than 90% of the country's total energy consumption and as such, it continues to be the dominant source of household energy. Yet the supply of wood fuel is increasingly getting scarce leading to an imbalance with the demand. Unfortunately the alternative fuels such as LPG, electricity are still not affordable to many households, especially the poor. The three stone fires continues to be the dominant energy technology used for cooking, yet in most cases the working environment is poorly ventilated and lighted. Exposure to Indoor Air Pollution is therefore increasingly being recognised as a problem and energy service providers have started to address the issue with fuel efficient cook stoves and smoke prevention techniques including improvement in the kitchen structure and work environment.

The business as usual scenario therefore seeks to advocate for an integrated approach to solving forestry and health challenges within the energy sector. This is due to the fact that challenges of

imbalances of supply to demand of wood fuel, together with problems of Indoor Air Pollution cannot just be addressed through only a forestry or health policy/strategy. While there is need for improved management of forestry resources and reforestation there also need for strategies to increase dissemination and adoption of fuel-efficient cook stoves, improvement in cooking methods and kitchen structures in order to cater for ventilation. These are just a few of what needs to be done and will help not only the women and children who mostly occupy the kitchen space because of their role of cooking but will reduce on the income spent on health and hygiene problems in the household. The men too would share in such improved health as the burden of sickness directly falls on their expenditure of income to cater for health bills of their household members.

Uganda has a National Gender Policy, which provides strategies on how policies and programmes undertaken by government, NGOs and donors should take into consideration the gender concerns. In terms of the energy sector, the differentiated tasks of women and men need to be taken into consideration when planning energy policies and programmes, because these form the basis of the energy services and technologies needed and the type. Lack of information on the available energy services and options to choose from, affordability and accessibility have continued to be the major problems women face in the energy sector. Strategies that enable women to be in places of decision making can be one of the solutions, however, this will not work if they are not given the appropriate skills to voice their concerns and are not empowered to make changes where they need to. Financing mechanisms for energy service provision have proved to be beneficial to women in cases where their roles are taken into consideration and are given skills to improve on areas where they lack the ability to initiate and implement various energy activities.

While the worse scenario is based on poor economic performance, the best scenario can be achieved through improvement in income in the next 10 to 15 years. This should not only be the household as a whole but also for the individuals who reside there. For, while men can command income, their energy needs are different from those of women who have to cook, ensrure a warm environment for the children, lighting for their reading needs as well as for lighting the chicken and cow sheds where they gain and income. Increase in income will enable improved choices, but this needs to be followed by disseminationof information on such choices. This may also lead to reduction in use of biomass, thus reducing the number of people who use forestry resources, especially for fuelwood. However, one must remember that there is need for strategies that bring up new intiatives that cater for alternative ways of coping with the different uses of fires from biomass (warmth, drying of cereals, proision of light).

Regional cooperation will improve coordination of energy planning that has strategies for institutional strengthening, skills aquistion for energy staff and sustainabe budgets for the energy sector. These in turn will enable appropriate implementation of programmes that enable access to choices of fuels that match women, men and children’s needs at household level.

Acknowledgements

The process of developing scenarios required experience from various fields and their relationship to the area of energy and poverty. This was possible through discussions, sharing experiences as well as learning from each others field of expertise. Thanks to Isaac Kapalaga, the Director of the National Forestry Authority and Fred Kafeero, Executive Director of Environment Alert ; Dison Okumu, Director, Cooperate Planning, Uganda Electiricty Distribution Company and Dr. Amandua, Director Clinical Services, Ministry of Health. The scenarios were formulated through a reflection on background information on the situations in the variuos sectors, which was worked on in the earlier periods of the SPARKNET process with dicussions and in-put from different people. Thanks to Conelius Kazora, an environmentalist ; staff from the Ministry of Energy and Mineral Development, especially Mr. Mubiru and Mr. Ndaula who provided information at the begginning of the SPARKNET process ; Mr. Turyahikayo, the Director of the Rural Energy Agency ; Engineer Murengezi of the Energy for Rural Transformation project ; collegues from the Department of Women and Gender Studies, and the members of the East African Energy Technology Development Network ; Intergrated Rural Development Initiative ; Peter Opio, stastician, Uganda Bureau of Statistics ; Olivia Nantaba and Rita Nakanwagi.

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1 Introduction

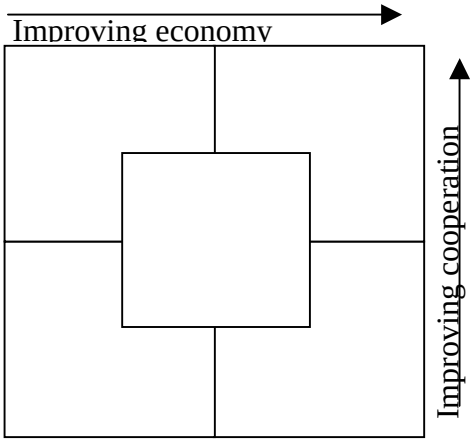
Sparknet is a multi-stakeholder interactive Knowledge Network focusing on how people, in the context of acute poverty, can gain access to better energy services and improve their livelihoods.

The network aims to make available resources for policy makers, companies, and civil society on energy poverty in Southern and East Africa. These are published through the network website www.sparknet.info. Sparknet focuses on three key themes – Health, Gender and Forestry – and the relationship of these issues with energy poverty. Output include detailed country reports, scenario analyses, and policy assessments. Two e-conferences will be held during the project – one on the scenarios, and another on policies.

Through a network of associates in Africa and Europe, Sparknet brings together 70 organisations and over 110 people from research institutes, NGOs, Governments and private companies.

1.1 Scenarios – what they are and why we have done them

Scenario analysis is simply a way of exploring realistic futures and predicting, based on our knowledge and experience how things could look in the future, how things could develop. As with all predictions we are likely to get it not entirely correct but the exercise is useful to stimulate debate on key issues. Scenario building is a *process* providing a structure for discussion and debate on what is could happen within a timeframe of the next ten to fifteen years. We will explore how things could change and how these changes are likely to impact on access to household energy in each country and across the Sparknet region. From these discussions, we hope to be able to make policy recommendations for poverty alleviation through identifying the key areas where policy action needs to take place. The intention is not to produce definitive studies but to stimulate relevant policy dialogue and serve as a basis for further research. Using management jargon we are looking here for 'blue sky thinking'. To do this we need to know the status quo (work-package 2, the country reports – which are now available on the Sparknet web site) and also to have identified influential organisations and projects and key actors who will shape the future of household energy provision (work-package 3, the draft version also available online).



External influences, such as changes in economic growth and levels of regional cooperation, are circumstances over which we have limited control. By identifying what policies might be effective under varying best and worst scenarios we have a good basis for debating potential policy actions which are pro-poverty alleviation, take into account our three themes – health, gender and natural resources / forestry – and are realistic under a broad range of external circumstances. As defined in the original Sparknet proposal, the intention is to develop a number of scenarios based on levels of economic prosperity and regional cooperation. The five possible scenarios – A to E – are shown in the 'box matrix' figure alongside. We believe it is sufficient to deal only with scenario A (business as usual), C (best case economy and co-operation), and D (worst case economy and co-operation). The other two are variations of these main scenarios. Both variables relate strongly to globalisation and market developments. This is the reason for including regional co-operation, since the Sparknet proposal was submitted to a funding window, which explored impacts of globalisation on energy poverty.

Because of the limited time/funding resources, these analyses are based – to a certain extent – on a subjective interpretation (the opinion of well-informed researchers, organisations and individuals in each country) of the impact of key variables and on findings of earlier studies (if available). It is

focused mainly, but not exclusively on the issues identified by the three Northern partners on Health, Gender and Forestry (these papers are available online from the www.sparknet.info website.)

The scenario development follows the following process:

1. The development of peer reviewed scenario analyses for each country including 'business as usual' and alternatives based on levels of 'economic prosperity' and of 'regional co-operation'. This current document is a working version of the scenario.
2. An international e-conference (through the Internet) will be held based on the scenarios for each country. The provisional date for this conference is the end of September, over a 2-week period (see the www.sparknet.info website for additional details).
3. Publishing of conference proceedings from the e-conference on scenarios

The scenario analysis will lead naturally to an analysis of *'what do we think will happen'* and *'what do we want to see happening'* (*or how best we can deal with it if it does happen)* in each country and the region, and leads directly into work-package 5 (how to get from one to the other – ie. policy recommendations).

1.2 Background information on the Scenarios

Uganda has an energy policy that has been operation since 2002. The main policy goal for the energy sector is to 'meet the energy needs of the Ugandan population for social and economic development in an environmentally sustainable manner' (Energy Policy, 2002). To point out a few of the strategies to implement this from the demand side, the policy includes strategies to deal with provision of affordable energy services for households and community based services to improve the social welfare of the rural population. Others deal with introduction of energy efficiency measures for industry and commerce as a way of enabling Ugandan industries to become more internationally competitive. The importance of transport energy and the use of modern energy in agriculture are promoted, through efforts such as the provision of facilities to finance energy services for rural agro-processing. From the supply side, the power sub-sector and that of petroleum are included together with that of biomass and other renewables, and the atomic energy and ionising radiation. The objective aimed at in the strategies for the biomass and renewable sub-sector is to develop the use of renewable energy resources for both small and large scale applications.

With a total population of 22.2 million as of the year2000, Uganda has 3.6 (16.4%) in urban areas and 18.6 (83.6%) in rural areas. In terms of access to energy, the main indicator used is that of access to the main grid of electricity. By the year 1999, the population accessing this electricity was 1%, which was noted to have increased to 5% as indicate by figure of 2002. Such an improvement was basically due to the strategies for power sector reform, which Uganda undertook. Thse strategies took several different dimensions, from corporate restructuring and privatization, to new governance arrangements, to dedicated electrification measures. The monopoly of the former Uganda Electricity Board's (UEB's) was resolved and new entrants in generation encouraged mainly in the distribution. Corporatization and restructuring of UEB was undertaken and has components of generation, transmission and distribution companies. Long-term lease concession agreements are given to private companies to enable generation and distribution. An independent regulator was established and these work on implementation of tariff reforms, which aim at cost-reflective pricing. Further more, there has been creation of new arrangements for rural electrification. This aims at enabling private and community organizations to undertake rural distribution schemes, assisted by capital subsidies from Government. A project, the Energy for Rural Transformation is therefore being undertaken.

In terms of household energy, the majority of low-income household use wood, for rural and charcoal mainly for the urban of which 5.23 million and 2.31 million toe are used respectively per year. There is a deficit of sustainable wood fuel supply. The majority of wood used by households is collected, not bought, which has economic implications, especially in the short term if were thinking about a transition to commercial fuels. However, all charcoal is purchased. Around 2 million tones (less than 1 million toe) of dung and crop residue is used per year, since wood fuel is in shirt supply. All this occurs outside the commercial sector. Kerosene is distributed very widely, with 42,000 toe used per year. LPG use is low and restricted to urban areas, where it is estimated to be used by around 14,000 homes. This therefore remains a minority used fuel and is predominantly for the better off.

2 Development of the scenarios

2.1 Business-as-usual scenario

As developing countries strive to attain macro-economic stability, they continue to face challenges in fiscal deficits, population growth and limited choices of energy services. There are also low levels of increase in new and adopted ways of converting energy to different uses as well as utilization of available energy services and technologies for purposes of productive end-use. These will continue affecting the growth of the energy sector in both the short term and long-term. There is therefore need to address this situation since people would like to improve on their standard of living by having access to various options of energy services, they should be available, affordable and accessible in forms that they are required. In Uganda, this will require increased investment, institutional collaborations between the public and private sectors. The Energy policy for Uganda also indicates that there will be need to develop linkages between the energy sector, poverty alleviation and economic growth as well as appropriate regulatory framework and capacity.

The Energy Policy for Uganda (2002) seeks to ensure that it enables sustainable development through integrating economic, social and environmental objectives. In doing so, effort is taken to ensure improvement in the well being of the current genaration as well as safeguarding the future generation. Projection of what will hinder or promote the energy sector is therefore useful in the planning process of this sector. The stengthening of regional cooperation through the estalishment of the New Partnership for Africa Development (NEPAD),is an opportunity to set up joint and integrated planning, interconnected grids and cross boarder oil pipelines for enhancing of energy trade and provision of cost-effective energy services,as pointed out earlier. The formulation of East African Energy Master Plan under NEPAD will enable processes of dealing with energy trade as well as exchange of information and promotion of petroleum exploration.

2.1.1 Fuel Access

Key issues in this scenario require reflection on the economic situation of Uganda, especially employment creation, improvement in health, incomes and other social factors and what contribution can be made through the energy sector. One of the efforts made by the government is to set up the Energy for Rural Transformation project(ERT), which is guiding the key areas for improvement of the energy sector.

The ERT project was designed to address issues of rural electrification. The project is implemented through eleven institutions namely: Private sector Foundation, Uganda as the Business Development Scheme/Energy for Rural transformation; Uganda Communication Commission for the Information communication technology component; Bank of Uganda to manage long term credit to be lent to private developers; Ministries of Energy; Health for Health energy packages; education for the education energy packages for both Government and private institutions; Agriculture to determine agricultural energy needs for private sector investments; Water to quantify different energy requirements for water supply; Local Government for information dissemination to local authorities, Finance to determine impact on poverty, and the new Rural Electrification Agency to avail subsidies to the private sector.

The ERT project has been designed such that rural energy and information communication-technologies (ICTS) can be built to exploit synergies with cross-sectors such as health, education, agriculture, education, water and small-medium enterprises (SMEs). In this regard the project makes strong linkages with the Plan for Modernization of Agriculture (PMA) and the government

Poverty Eradication Action Plan (PEAP). Investment in the power sector can therefore be undertaken, and effort will be made to ensure that the poor access the electricity generated.

The project has the following strategic choices. It aims at stretching the project's boundaries beyond the energy sector to focus on rural transformation especially making a significant change in the productivity of rural enterprises as well as the quality of life of rural households. Under ERT, energy and ICTS are used to assist with the transformation of the agriculture sector through improved agro-processing, increase on post harvest storage as farmers switch from subsistence to commercial farming, better access to market information, timely market information, and better information dissemination for agricultural extension and education. For health, ERT facilitates the country's minimum health care package by providing energy for medical equipment, lighting, cold chain, sterilizing and communications. In education, ERT focuses on post primary education with targeted impact on vocational training where machines and equipment require energy, secondary schools where access to computers and electronic information should improve the quality of education.

Further more, ERT promotes rural electrification in a commercially oriented manner under which the investment, operational and consumption decisions are made on an un subsidized basis while affordability and equity considerations are tackled by an appropriate subsidy. ERT supports multiple business models including public-private joint ventures and supports different supply options ranging from stand-alone mini-grids, to grid extensions, small solar photovoltaic systems and other sources of energy. It focuses on both households, rural enterprises and public institutions.

As such effort gets into the implementation phase, the country still faces rising demand for energy services. This has resulted into over dependency on biomass energy. Wood contributes more than 90% of the country's total energy consumption. Unfortunately there is low speed in using modern energy. In terms of comparisons of costs of fuel in order to address affordability, it is difficult to do so. Most of wood, dung and crop residue used, is collected and not purchased. Yet kerosene and LPG appliances are sold, they are more fuel-efficient than open wood fires. As such, energy available for cooking and other uses, from one toe of these fuels, in particular LPG, is much more than from one toe of wood burned in the famous three stone fire. However, taking the market prices, wood is the cheapest form of energy (16-38 Euro/toe), followed by charcoal (200 Euro/toe), kerosene (820 Euro/toe) and the poor continue using it.

2.1.2 Fuel choice

Economic hardships have continued to hinder the poor from purchasing the few varieties of energy options that are available. In urban areas, the population that can access electricity, mostly use it for lighting, communication, such as charging of mobile phones; powering of radio and television. Kerosene is mostly used for simple cooking, especially tea and quick foods. They then use wood fuel for cooking, boiling water for drinking and bathing. Those in rural areas, those who have access to electricity, rely on wood fuel and agricultural residue. Due to increase in agricultural production as well as construction of houses, the areas where women and children have fetch wood fuel is usually far from their residences and they tend to transport such fuel on their heads. Availability of this wood fuel is therefore questionable in the future as population grows and agricultural production and housing increases. Affordability is also an issue in cases where there can be few energy options. For example the costs of empty gas cylinders is 20,000 shillings for a 6kg cylinder; 30,000 shillings for that of 12.5 kg; and 60,000 shillings for that of 38 kg. Then for filling in gas the 6kg costs 17, 900 shillings; the one of 12.5 costs 35,500 shillings; and that of 38kg costs 102,900 shillings (source, Total Petrol service station, Kampala; exchange rate of 1 dollar to 1,700 shilling used). Connection fees for electricity, duration and mode of payment are also hindering factors.

One of the main ways of reducing poverty is through utilizing energy for productive end-use. The main types of micro-enterprises outside of the home are rural computer schools, rural schools, video shows rooms and shops that need to be lit in the evenings. In the home, women work extra housing the evenings in order to participate in income earning projects and would wish to have light from electricity. Kerosene is the main fuel for lighting and grid electricity where available. Of those without grid access, more than 90% of households use batteries for various purposes, especially for commercial purposes of charging telephones and running video show rooms. Solar photovoltaic is also being increasingly introduced to solve some of the lighting needs.

2.1.3 Gender

Uganda is basically a patriarchal society with most of the household related tasks being assigned to women while men dominate those tasks done outside the home and where income can easily be acquired. Through such a setup, women have the responsibility of providing energy that is needed for the tasks they undertake in the households, especially cooking. Women undertake the tasks of collection, planting and harvesting (of fuel wood) and are the ones who mostly have the knowledge and practice of the different uses of energy. Women mostly rely on biomass as the form of energy, which they use with three stone fires, especially in cases where they lack information and techniques of utilizing fuel-efficient cook stoves. Sometimes, cultural values hinder utilization of fuel efficient cook stoves as women feel that the food may not have the appropriate taste or will not cook properly over the "modern" stoves. Women therefore continue to operate in poor health environment and their working space is full of smoke, which subjects them to indoor air pollution. Acute respiratory infections, tuberculosis and other diseases have been found to be major problems faced by women and children who are exposed to indoor air pollution (ITDG-EA smoke health project).

Due to different uses of land, especially for commercial purposes, woodlots are becoming scarce and sources of fuel wood are rare. Women, assisted by their children, have therefore to walk long distances to collect fuel wood, which is in most cases not sufficient for their needs and may be of poor quality. They use a lot of time, which could have been spent on other tasks within the domestic field and in those areas where they could earn income. Policies and programmes need to take into consideration strategies that deal with reduction in use of women's time. Yet, it is mostly men who participate in decision making within the household and even in community meetings where discussions on issues of access to and control over individual and communal resources, such as sources of fuel wood, water, and agricultural land, are held. Most of the time, such discussions miss out on energy since the women who are mostly concerned, are left out. Further more, men dominate ownership of resources, such as land where wood lots are planted, although currently women have control over those resources they have acquired through purchase and a few by virtue of being married.

The demand for energy services is influenced by decisions made on the use of the service, who uses it and who will benefit. Women and men have different needs and uses of energy due to the differences in the tasks they undertake in both the household and workplaces. Further more, women require energy services mostly for household needs and small businesses, which they carry out. On other hand, men seek for such energy services to improve on quality of their income earning businesses, such as powering their communication tools to have access to information, for example the cello phones, computers, radios or for leisure within the communities (such as video shows in rural town centers) and entertainment in the house. Decisions on household expenditure within the available resources therefore tend to favour the demands of men and male children due to the patriarchal set-up of decision-making. Headship of household also plays a role here, since in those households where women manage the household income they are able to decide and make acquisition of energy services a priority concern.

Access to energy is therefore hindered by the decisions of the users and the benefit envisaged. Apart from that, costs of different fuels hinder access to energy services since affordability has to be taken into consideration when purchasing. Although this concerns both women and men, the cost of energy appliances and technologies can hinder the choices that can be made between use of one or the other. Whereas women would have preferred use of modern fuels such as LPG, kerosene and electricity, the cost of these can hinder their accessibility and use. Both women and men from poor households therefore suffer since their incomes cannot enable them to afford modern energy. Worse still they have had to engage into purchase of fuel wood and charcoal, whose cost is also increasing due to scarcity and commercialization of the product. Even in cases where there is effort to have access to solar, electricity and gas, such appliances require battery charging, payment of bills, or carrying of heavy weight to fill in the gas cylinder. These have a cost on time as well as transport.

Cost of energy technologies and their availability also hinder access to and utilization of energy for productive end use. For example, in a project in Kayunga district where farmers and food processors use solar driers for drying of pineapples for export trade, the cost of the solar dryer as well as availability of those that reduce on wastage of produce, have been a challenge. Poor women and men have undertaken strategies to deal with this through working in groups, mobilising resources together. Through such mobilisation, they have been able to obtain assistance from NGOs, (such as the East African Energy Technology Development Network-EAETDN), for technology training, capacity building in organizational management; the Post Harvest Program from Kawanda Agricultural research station, for technology transfer, use and maintenance; and provision of export trade and marketing advice and skills from export companies (such as Fruits of the Nile and Fiona enterprises). Few technology options limit the choices women and men can have in order to improve on their activities that target productive end use. The policy focus has neglected this area just like the planning and implementation of projects in this field.

The policy shifts in the liberalization of fuel markets have stimulated private sector investment and provision of energy services. However, the rural and peri-urban poor are bound to continue being deprived of energy services due to increase in prices as the private sector puts into consideration the cost of the service and its delivery. This is likely to affect women more than men, since women mostly get access to energy technologies whose dissemination can reach the household, while men can be able to reduce on cost by going to the energy service provider. Those private sector stakeholders who have embarked on providing credit for solar, LPG and other clean fuels, have started realizing the need for taking into consideration the gender differences in the needs of women and men, the youth, the elderly, the sick (especially those with HIV/AIDs). Where there efforts have been successful, it has been due to capacity building of the credit providers to take into consideration the needs of women and men, since the product they deal with is more of a consumable than the commercial ones they are used to. Client assessment requires consideration of tasks undertaken by women and men as well as their source of income.

2.1.4 Health

As indicated earlier, wood contributes to over 90% of the country's total energy consumption. However, this wood is used in inefficient cook stoves, especially the three stone fire, to provide energy for cooking, drying cereals and warmth for areas in the mountains. Apart from that, where kitchens exist, they are not well ventilated thus women and children who mostly occupy this space while cooking, suffer from smoke. ITDG-EA project on smoke and health, noted that such smoke contains pollutants including carbon monoxide, nitrogen dioxide, sulphur oxides and others. Exposure to such indoor air pollution is dangerous to those women and children, as it has been

found to be one of the causes of respiratory diseases, asthma, tuberculosis, low birth weight and diseases of the eyes.

The health sector has not yet taken AIP problems as key priority concern, compared to more urgent challenges such as HIV/AIDS, malaria and meningitis. There are still low levels of awareness of the problem as well as lack of policy actions. Funding for research into such a problem is still limited, apart from efforts made by ITDG-EA by implementing a project in Uganda and Tanzania. Yet, those who get sick from AIP increase on other women's tasks of caring and they also strain the household budget through purchase of medication and costs of treatment.

2.1.5 Forestry

Forestry is a major sector in Uganda that contributes to employment and livelihood of the rural women, men and children. Its contribution is further extended to agricultural production where forests are key in maintaining soil fertility and purifying water as well as regulating rain and other climate changes. Wood fuel contributes more than 90% of the country's total energy consumption and as such, it continues to be the dominant source of household energy.

Uganda has a total area of 241,551 square kilometres. The National Biomass Study indicates that this area is comprised of mostly farm land, followed by grass land, wood land, water bodies, bush land, tropical high forests that are stocked, tropical high forests that are degraded and others. If the water body is excluded, the land area measures up to 20.5 million hectares and out of this, forests cover 4.9 million hectares (about 24%). These forests include plantations of hard and soft wood, tropical high forests and woodlands. There are fuel supplies nationally, especially in Nakasongola and Gulu districts, which substitute fuel deficits in Kampala where there is high population. Further more, 490 square kilometres (13%) of the total area of Uganda is under protected areas. Out of these, 5% is owned and managed by the Forest Department while the Uganda Wild Life Authority manages 8% and these are the areas where there are National Parks and Game reserves. The rest (87%) is under private ownership. Out of the total of protected areas, there are 506 Forest Reserves and these cover 1.4 million hectares. The government decided to give special protection to these reserves. A National Forestry Authority was therefore created to be responsible for the Central Forest Reserves (CFR) and involves other partners in the country, community and private sector. This partnership approach enables implementation of activities in ways that support decentralisation, privatisation and conservation and working with forest-users through strategies that are in line with the Poverty Eradication Action Plan. It was envisaged that the CFR "will play an important role in meeting Uganda's future wood demand, creating income and employment and improving the livelihood of rural communities"(National Forestry Authority, 2003 p.6). The protected areas hold 155 million tons out of the total of 468 million tons of air-dry biomass above ground, which is available in Uganda. However, 58,00ha (5%) of the Central Forest Reserves have been degraded or depleted, and deforestation is taking place in Local Forest Reserves (NBS p ix).

With the above-mentioned situation, the NBS indicates that Uganda can achieve a total annual growth of 50 million ton of biomass per year and out of this, 15 million tons will be in protected areas. Despite such a situation, not all wood available in various vegetation covers is accessible for household energy. This is due to the legal issue, ownership, distance, environment rules and the management structure in the communities. In some areas, the collection of fuel wood is free but it in areas where there is scarcity, there is commercialisation of amount collected. Where the rules of charcoal burning have been followed, there are licences given. However in most cases the demand in the informal market of charcoal selling has led to illegal production of charcoal. Yet, the alternative fuels to fuel wood and charcoal are not yet affordable, especially to the poor in rural and urban areas.

Business as usual: In terms of future biomass supplies, the NBS notes that there will be a deficit of 846,000 tons by the year 2025 from the current 312 million tons of biomass in the private lands. While most of the loss will be in tropical high forests, due to clearance of the land cover, biomass in the farmland will "increase from the present 110 million tons to about 113 million tons by the year 2030" (NBS 2003 p. x).

2.1.6 Policy options

Health:
An integrated and cross-sector approach need to be undertaken in order to address the dangers of AIP. As such, the health sector on its own will not manage to deal with all the issues that can prevent the diseases of AIP but other sectors such as housing, environment, finance and technology, also have to provide their skills and experience in addressing the problem.

Research on IAP should be promoted in order to provide data that planners in the different sector can rely on for designing interventions.

Policy planning in the different sector that are concerned should consider AIP among the priority concerns and budgetary allocation should be made in order to facilitate both public and private interventions.

Gender:
Access to energy options should be promoted through setting up distribution channels that are nearer to the users. In addition to this, financing mechanisms that promote access to enegy services for the rural and urban poor should have strategies to address the needs of women and poor men who are in most cases excluded from such initiatives. Such access to energy services can enable women to get into income earning activities that will not only benefit them but also the members of their households, including support to the income earned by the male spouse.

Strategies to enable women to participate in decision -making should be promoted, especially in cases where energy policy planning and implementation of programmes are being undertaken.

Forestry:
Strengthening of forestry institutions and those which link with this sector (such as agriculture, energy, poverty monitoring, education and health) will enable improved performance of the sector. Collaborative activities that support community involement will enable increase in tree planting and conservation as well as taking into consideration the women's needs for tree species that can provide fuel wood.

2.2 Worst-case scenario

The business as usual scenario can be worsened in various ways. If there is no institutional strengthening of the stakeholder organizations, especially private sector, to take up ventures to increase availability of electricity and other fuels, then the aims of the Energy for Rural Transformation project will be affected. Rural people will continue using more and more woodfuel while urban and peri-urban areas will continue utilizing charcoal. This will put increased pressure on forests and forest resources. There will be ecological problems and women and children would even increasingly suffer from health problems of using woodfuel without efficient technologies and poor kitchens.
Although the construction of Karuma and Bujagali dams is on the way, lack of implementation of such plans can affect increase in electricity potential and supply. Apart from that, siltation of

hydropower dams can affect the flow and supply of electricity in the country, thus affecting employment creation, income acquisition. Elnino is another challenge that can be faced as it affects not only the water supply but also agricultural produce, which in tern reduces incomes of those who rely on crop and animal exports and trade.

In cases where there is lack of alternative energy services and technologies, the quality of life will reduce as people tend to find coping strategies by either reducing on the activities where they need energy, such as cooking less meals per day or eating inferior food; not boiling water and other tasks. This will lower their health status and women and children are likely to be affected more in this case.

2.2.1 Fuel Access

Failure of the implementation of power sector reform, especially the generation and distribution of electricity, will result in low uptake of people to purchase electricity as consumers will get fed up of lad shedding, power cuts and low level of services from this sector. Although the few choices of fuels will persist in this scenario, the high costs and limited access modern energy options ill prevail. This will force even more people to shift from those energy option they have been suing to get back to use of wood fuel. Population growth will also have an impact on the resources available. In cases where there is limited or no fuel choices, people will tend to use anything which can burn, including jericans, paper, and others, thus increasing their exposure to indoor air pollution as well as other health problems. Even the use of agricultural waste will have an effect on the productivity of agricultural land as such materials are currently used for fertilization.

2.2.2 Fuel choice

There will be reduction in biomass resources as more and more households in Uganda continue depending on biomass. There will be increased costs of energy as people continue finding the cost of energy service expensive and not affordable. Such situations can result due to reduced generation, production and distribution of electricity, having lower incomes and therefore less affordability from those who would have wanted the services. Apart from that, prolonged drought in Uganda can lower the Lake Victoria levels in the years to come and this will affect the generation of electricity in Jinja. Within this scenario, there can also be increase in load shedding, which can grow faster than the current 8% per annum.

2.2.3 Gender

This worsening situation will impact on women negatively through increasing the time they need to collect wood fuel as well as the distance they have to move. However, it is likely that men will be over burdened by having to take on some of the fuel collection in cases where there is need to use bicycles for transport of wood fuel (in Buganda region, culturally women do not ride, but in other areas, it is not a taboo). In cases where there are women from female- headed households, this will be a problem since they may have to rely on their male children or hire other male colleagues to help out. More time will also be taken in preparing meals and there is likely increase of malnutrition. Women will be further exposed to AIP as they resort to use of inferior fuel, yet thse may also be difficult to get in the time they are needed.

2.2.4 Health

Such worsening conditions will lead to more diseases not only from AIP but also exhaustion and fatigue households suffer from lack of appropriate fuels. There is likely to be increase in mortality rates, loss of time that would have been spent on income earning activities and malnutrition. Yet,

preventive health services have not taken into consideration the need for measures to address AIP but instead lay emphasis on curative care. In this scenario, less effort will be put on interventions to reduce IAP, women will face increased drudgery, and there will not be care for nutrition as a component of household energy and poverty reduction. There will be limited research, information dissemination and sharing of experiences, thus new initiative cannot be obtained.

2.2.5 Forestry

The impact of population growth on subsistence farmland is worth noting. The NBS predicts that there will be "a decline from 0.3 ha in 1991 to 0.1 ha per capita of forest area by the year 2025"(NBS 2003 p.x). Fuel supplies will be affected by population trends, especially due to the preference made by the rural people to have more land under cultivation than area under trees. Yet, even where farming is neglected due to low prices and lack of markets for the produced goods, it can make people migrate to urban areas in search of income, thus leaving land under fallow and owners would be absent to take care. Land tenure is another aspect. For example, the mailo land-owners do not allow squatters to plant trees because these may be long term investments. They prefer production of short-term periods, such as food crops. As such, planting trees for woodlots is also threatened. Further more, population growth especially areas with refugees, has led to a lot of encroachment on natural forests and yet the rate at which the tree grows is very low.

2.2.6 Policy options

There will be no improvement in the household energy situation in relation to this worsening situation. There is need to embark on strategies to address the provision of a wide variety of energy choices that can be used within the household and for productive end-use. Efforts can be made at regional and sub-regional level to engage into research and dissemination of information on AIP. Combined effort at such levels can enable influencing of energy and cross-sector policies to take into consideration the need for prevention of AIP through various interventions.

In terms of gender, the research mentioned above, should include gender disaggregated data in order to show the extent of the problem and reasons why it is increasing; what can enable reduction of such a problem. Apart from that, there is need to take note for the changes in power relations as women get more burdened by reliance on wood fuel which they have to get from long distance and in fewer amounts. The changes in gender roles that may result, may be seen in a negative way, in cases where they draw men away from their role of income earner. However, strategies need to be formulated to find a balanced way of dealing with such a situation.

Strategies to address accessibility to alternative fuels should be taken into consideration by both public and private sector stakeholders.

In terms of forestry, it is likely that biomass fuel will continue being the main source of household energy in ten to fifteen years to come. Policies on population reduction can help to plan for future resource use and demand by the people. Members of households should be encouraged to plant wood lots, especially in private lands and household land as these can cater for the needs of wood fuel.

2.3 Best case scenario

B: Best Case Economy and cooperation

Increased economic performance of the country, improved skills and improved communication and information networks, will enable increased innovations, generation and distribution of different energy options so that choices can be available to the people.

The Energy for rural transformation Project will be implemented successfully together with increased awareness, accessibility and use of modern energy, including LPG and geothermal. This will lower dependence on biomass thus reducing pressure on forestry resources. Women can then be able to make choices if they have options to select from. The health standards of the household will improve as efficient cooking appliances are used, clean fuels used, ventilated kitchens and healthy working environment. There will also be increased innovations of conversions of different fuels for different uses will enable improved availability of energy to rural and urban households.

Regional cooperation will function successfully through the EAC, NEPAD and others so that planning and implementation of energy policies and programmes can be worked out collaboratively in order to increase availability of various fuels.

2.3.1 Fuel Access

The best scenario is one which is governed by: availability, affordability, accessibility and sustainability of the energy options. Energy remains a key priority concern for government and budgetary allocations are made for the energy sector and its linkages to other sectors such as agriculture, health, education as well as cross-cutting components like poverty reduction and gender.

Increased incomes for the rural and urban poor can enable increased purchase of the energy services and improvement in livelihood.

Generation of electricity will increase given the construction of the dams as well as the commissioning of the oil pipeline from Eldoret to Kampala. Petroleum products will therefore be more and easily available andIncreased economic performance of the country, improved skills and improved communication and information networks, will enable increased innovations, generation and distribution of different energy options so that choices can be available to the people.

2.3.2 Fuel choice

With a situation where there are increased incomes, economic and political stability, all people who need energy services will be able to purchase and use them. Different options can be put on the market and women and men would be able to make choices that match their needs that are related to the tasks they undertake. Public and private investors as well as members of households will invest in clean and modern energy that is in line with the intended use: whether domestic or commercial purposes for the productive end-use. There will be reduction in energy costs as a variety of options will be available. This will reduce reliance on biomass as alternatives such as LPG, electricity, geothermal and solar will be available affordable.

2.3.3 Gender

This scenario reflects a situation where access to energy is influenced by both women and men who have equal opportunities to voice their concerns and indicate their energy needs. Women as users as well as innovators will benefit in this scenario. The costs of different fuels will no longer hinder access to energy services as household decision making processes will encourage expenditure on modern energy that meets the needs of women, men and children. The burden of collection, the time taken and the distance covered will be reduced since wood fuel will only be used as an option but not the only one available. The cost of energy appliances and technologies will no longer hinder the choices that can be made between the use of one or the other. Women as well as men can use any preference they want in using modern fuels such as LPG, kerosene and electricity, and these will be accessible and easy to use. Both women and men from poor households will have income to afford modern energy.

2.3.4 Health

This scenario will lead to experiences of reduced incidences of AIP and related diseases as women and children shift to use of cleaner energy without smoke. Increased incomes will enable expenditure on improvement of kitchens and the working environment. More organizations and individual housel will get involved in design and dissemination of interventions that reduce smoke in the kitchen as well as sharing of experiences of best practices. This will enable awareness creation right from community level to policy making. Communication of health related messages will also be possible to rural and urban poor as they will be able to have access to newspapers, radio and television services.

Health institutions, especially the Ministry of Health, will continue linking with the energy sector stakeholders in order to have collaborative programmes that cut across AIP, to production of energy technologies that take into consideration the health standards . Research and information dissemination on the link between energy, health and forestry need to be promoted together with the cross-cutting issues of gender and poverty eradication.

2.3.5 Forestry

Improvement in the economy as well as increase in information dissemination on alternative sources of energy (electricity, LPG, kerosene and other renewable sources) will enable increased use of these sources since users can have choices to select from. This will reduce on the demand for wood fuel as well as the effects of deforestation. Use of these sources will however also depend on increased incomes for both women and men in order to facilitate the power to purchase. It is also important to formulate strategies that deal with improvement of decision making skills for women to be able to influence decisions in planning of energy programmes and influence household expenditure to cater for their energy needs. Programmes that deal with planting of trees should encourage use of household land that is accessible to women and children in order to ensure availability of fuel wood in cases where household need to continue using it.

Institutional strengthening and management of the forestry sector are key needs for the improvement of the sector. This is also important for improved performance of the protected areas, and the NBS predicts that with such conditions, “the present supply of 167 million ton (as of the year 2000), would increase to 536 million tones by the year 2025 (NBS 2003 p.x). They further predict that such growth in the protected areas will offset the deficit in the private lands.

2.3.6 Policy options

Although effort can be made by NGOs and other stakeholders who deal with designing interventions for AIP, these can not yielded the desired outcomes if AIP is not made to be part of

the health and energy regulations and policy concerns. Public health acts and rules should be made part of household energy care. Public health acts and rules should be made part of household energy care. Household energy should be recognized as a health and development concern. There is need to promote the use of cleaner fuels. The kitchen made to be a safe place for women and who spend long hours in the kitchen. There should be encouragement of subsistence forestry both regionally and nationally. More to this is the substitute with rural transformation enforced by Ministry of Energy and Mineral Development. The NBS calls for urgent strategic policies and natural resource management plans. Gender mainsteaming in the energy, forestry, health should be undertaken and promoted through the different.

Closure

In the development of the economy, these scenarios have shown that energy plays a major role and is one of the major needs for women, men and children. The growth of the economy together with improved regional cooperation, have been realized to be key in paving the way for the development of the energy sector and its link to health and forestry.

The development of the energy sector requires appropriate policy and programme planning as well as mechanisms for effective implementation that takes into consideration of gender responsive and poverty alleviation aims. Such planning requires investment in research and information dissemination as well as policy advocacy. Capacity building of the policy planners is needed in order to enable them to be equipped and cope with the changing demands of the energy sector as it links to the different sectors, especially health and forestry. Energy for productive end-use should be promoted, as it is the main route to linking energy, poverty reduction and empowerment of women.

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www.sparknet.info (website)

Appendix A Overview of scenarios

Criteria/Issue	A: Business as usual	C: Best case economy and co-operation	D: Worst case economy and co-operation

Criteria/Issue	A: Business as usual	C: Best case economy and co-operation	D: Worst case economy and co-operation
Current situation – short summary: What are the key issues / constraints which you have identified within your country regarding provision of household energy at the current time – particularly with regard to health, gender and forestry?	**Key issues, constraints regarding provision of HH energy particularly with regard to health, gender and forestry.** **A. Bussiness as usual** • Strong economic growth averaging 6% per annum has been achieved in addition to macro-economic stability. Although this has happened in the last decade due to the macro-economic adjustment and structural reforms, about 35% of the population is still below the poverty line. • Although poverty levels in the country are being addressed through implementation of strategies in the Poverty Eradication Action Plan, the rising demand for energy services is yet to be solved. There is over dependence on biomass energy. Wood fuel contributes more than 90% of the country's total energy consumption and as such, it continues to be the dominant source of household energy. The level of demand for biomass energy does not match with that of supply. • As World trade negotiations continue at international level, the developing countries continue to be affected by unfair terms of trade and lack of subsidies on renewable energy, such as those in Europe. • A national level, over dependence on forests and tree species from private lands for biomass leads to deforestation. • As sources of wood fuel continue to get scarce, women and children spend more time than ever in collection and transporting such fuel. Time-use surveys can help to calculate such time. Alternative uses of such time lost can be beneficial to women if they can access fuel efficient energy technologies or alternatives to these. Income earning activities in combination with skills enhancement can help women in the way they can utilize the time saved from collection and transportation of wood fuel. • Use of wood fuel with inefficient cook stoves and lack of ventilation in the kitchens will continue to affect women and children who suffer from the smoke in such working environment. IAP will continue to be a problem to women and children who suffer with smoke in such conditions. • There are low levels of innovations for appropriate household energy technologies that an be used for several uses and converted to different energy needs. This limits availability of such technologies & also hinders women and men's access to such innovations and has effects on health, forests and trees. • The cost of alternative fuels to biomass, especially electricity, LPG and others, together with the appliances used, hinders access to these fuels by poor households, which cannot afford. Such exclusion of poor means that it is this group which continues to be susceptible to health problems and lack of income in cases where they would have used such fuels to engage in income earning activities. • In cases where there is poor infrastructure, especially roads and transport facilities, lack of credit facilities for energy services, mobilisation for distribution and dissemination of energy services and technologies, these affect accessibility and availability of modern fuels and technologies. As such rural communities continue to be excluded although also the urban poor are affected in this way as they lack the money to afford such fuels. Such factors hinder the appropriateness of the fuels to the needs of women and men as their dissemination and delivery does not match with the time they are needed as well as their use. Women and men continue to be at a disadvantage although at different levels, their health is threatened and the forestry sector continues to get exhausted as the only alternative available in such needs. **B: Best Case Economy and cooperation** • The Energy for rural transformation Project will be implemented successfully together with increased awareness, accessibility and use of modern energy, including LPG and geothermal. This will lower dependence on biomass thus reducing pressure on forestry resources. Women can then be able to make choices if they have options to select from. The health standards of the household will improve as efficient cooking appliances are used, clean fuels used, ventilated kitchens and healthy working environment. • Increased innovations of conversions of different fuels for different uses will enable improved availability of energy to rural and urban households. • Regional cooperation will function successfully through the EAC, NEPAD and others so that planning and implementation of energy policies and programmes can be worked out collaboratively in order to increase availability of various fuels.		

Criteria/Issue	A: Business as usual	C: Best case economy and co-operation	D: Worst case economy and co-operation
	C: Worst case economy and worst case cooperation • The business as usual scenario can be worsened in various ways. If there is no institutional strengthening of the stakeholder organizations, especially private sector, to take up ventures to increase availability of electricity and other fuels, then the aims of the Energy for Rural Transformation project will be affected. Rural people will continue using more and more woodfuel while ubarn and eri-uraban areas will continue utilizing charcoal. This will put increased pressure on forets and forest resources. There will be ecological problems and women and children would even increasingly suffer from health problems of using woodfuel without efficient technologies and poor kitchens. • Although the construction of Karuma and Bujagali dams is on the way, lack of implementation of such plans can affect increase in electricity potential and supply. Apart from that, siltation of hydropower dams can affect the flow and supply of electricity in the country, thus affecting employment creation, income acquisition. Elnino is another challenge that can be faced as it affects not only the water supply but also agricultural produce, which in tern reduces incomes of those who rely on crop and animal exports and trade. • In cases where there is lack of alternative energy services and technologies, the quality of life will reduce as people tend to find coping strategies by either reducing on the activities where they need energy, such as cooking less meals per day or eating inferior food; not boiling water and other tasks. This will lower their health status and women and children are likely to be affected more in this case.		
What are the impacts on **Fuel Choice** for household energy under BAU and worst case / best case scenarios for the economy and regional co-operation over the next 10-15years?	Apart from having a few choices of fuels, followed by high costs, there is very slight improvement in fuel usage with energy efficiency and conservation being adopted by a few in the urban setting. Fuel for lighting is slightly improving from the current level of paraffin lamps, *tadooba*, candles and flash torches to grid and isolated grid electricity. Wood fuel is expected to continue due to few choices of fuels to select from at household level.	The costs of energy will reduce due to improved performance of the economy and improved service delivery by both private and public institutions. Increased incomes will also enable affordability of the energy services. Fuel choices will be widened thus reducing pressure from biomass use and implications on forestry resources.	In cases where there is limited or no fuel choices, people will tend to use anything which can burn, including jericans, paper, and others, thus increasing their exposure to indoor air pollution as well as other health problems. Even the use of agricultural waste will have an effect on the productivity of agricultural land as such materials are currently used for fertilization.
What are the impacts on **Fuel Access** for household energy under BAU and worst case / best case scenarios for the economy and regional co-operation over the next 10-15years?	The imbalance in the supply-demand of wood fuel has continued and this affects forest and their resources; women and children continue to travel long distance to fetch wood fuel. Access to modern energy, especially electricity is slowly increasing but can improve more with the implementation of the ERT project. Such improvement can lead to increase in access to electricity for 15% of the households from the current 9%. Few choices of energy has led to low levels of productive use of modern energy, which has continued to keep women and poor men in low	Increased economic performance of the country, improved skills and improved communication and information networks, will enable increased innovations, generation and distribution of different energy options so that choices can be available to the people. Generation of electricity will increase given the construction of the dams as well as the commissioning of the oil pipeline from Eldoret to Kampala. Petroleum products will therefore be more and easily available and	Reduction in biomass resources; Increased costs of energy; Reduced generation, production and distribution Lower incomes and therefore less affordability; Prolonged drought will lower the Lake Victoria levels in the years to come; Load shedding will grow faster than the current 8% per annum.

Criteria/Issue	A: Business as usual	C: Best case economy and co-operation	D: Worst case economy and co-operation
	income situations. Access to electricity will increase to 50%of households in Uganda. The other 50% will use the easily available and affordable petroleum products extracted locally and /or imported more economically through the oil pipeline through Kenya.	affordable to Ugandans. The oil exploration exercise taking place in the Semliki region will yield positive results and Uganda will become a net oil exporter. Natural gas from the oil fields will supplement the production of electricity by hydro sources. will	
In the left hand side boxes below, review specialist paper and others and identify issues which will be impacted by the changes identified above	**In each of the boxes below, jot down points on the relevance, developments, implications of each of the scenarios on the issues raised in the left hand column.**		
Health Issues - impacts on health: • Dangers of IAP to individuals as well as household members • Possible interventions • Health, nutrition and energy issues	-Prevalence of IAP and the risks which women and children go through since they are exposed to smoke; -Family budgets are constrained due to such illnesses -In cases where interventions have been undertaken, there are positive results. -Interventions include, kitchen improvement to remove smoke; fuel efficient stoves introduced, awareness about the problem especially to sensitise policy makers	-Risks of IAP can be reduced and healthy population can be able to improve on income and make use of modern fuels; - a safe and healthy working environment for women and children; - health services need to be involved in addressing IAP -reduction in time spent by women and children in wood fuel collection and transportation will enable improvement in income and nutrition	Increase in mortality rates, loss of time that would have been spent on income earning activities -Preventive health services are key, yet they are forgotten especially in terms of IAP. Effort put on curative care. -The need for interventions to reduce IAP, avoid drudgery, need to care for nutrition as a component of household energy and poverty reduction -Limited research, information dissemination and sharing of experiences
Health Issues - policy options on health - IAP interventions - Research awareness and promotion - Regional and sub-regional collaborations	• Low levels of awareness of the dangers of IAP by planners in the energy, health and forestry sectors • Research and information dissemination should be increased, in cases where they already exist, or crated where they lack. Increased skills in research on IAP and its effects should be undertaken as well as other needs in capacity building. This requires budgetary allocation in order to will fill up the information gaps that exist. • There is need for improving the enabling environment, formulation of programmes	Household energy being recognized as a health and development concern -Use of cleaner fuels promoted - Public health acts and rules made part of household energy care - the kitchen made to be a safe place for women and who spend long hours in the kitchen	Regional and sub-regional collaborations on research and awareness creation should be encouraged - promotion of interventions should be improved -promote formulation of initiatives and mechanisms that enable provision of cleaner energy sources

Criteria/Issue	A: Business as usual	C: Best case economy and co-operation	D: Worst case economy and co-operation
	and effort to enable households to shift from use of dirty polluting and unhealthy fuels to cleaner modern fuels as well as improved technology • Build partnerships at national and regional levels to support the formulation of policies on IAP. This will enable a working framework and enforcement of appropriate methods of work. • Pay attention to primary health care, set up standards through enforcing public health acts and make use of cross-sectoral approach that can include forestry, health, education, gender and other sectors.		
Gender Issues - impacts on gender	Women in urban and rural areas have few options of energy services and technologies to choose from. Wood fuel therefore remains the main fuel they use. - there are differences between women and men in accessing energy services. While men mostly dominate the access to commercial fuel wood production and sometimes the way it is marketed, women suffer with collection and transportation of wood fuel, sometimes with assistance of their children. -time spent in collection and transportation of fuel wood is important to note when planning f energy services	-Promotion of energy for productive end-use will enable economic empowerment of women -Where efforts are made to enable women to participate in decision making, they will be able to make a contribution to planning of accessibility an affordability of energy services. -there will be reduction in time women used for collection and transportation of wood fuel; their health and that of children will be improved.	If measures to improve accessibility of women to energy services and modern fuels, more drudgery will be experienced, increase in deaths due to AIP, low incomes. Women will not be able to make decisions sue to lack of opportunity to do so as well as limited options to make choices from.
Gender Issues - policy options on gender	-there is need for recognising and documenting women's contribution in the use and dissemination of energy services. -countries should formulate ways of allocating resources to gender and energy programmes -gender should be integrated in energy policies	–women should be encouraged to participate in decision making, especially on energy planning and implementation - this can be possible through development of women's capacity to plan and implement energy projects -energy policies that are gender responsive will ensure that access to energy for women is a key component of the strategies	Where women are not gin opportunity to participate in decision making, energy services will continue to exclude them, yet they are key in sustaining the household -increase in use of efficient energy technologies will enable men to get out of drudgery but this will only be possible if income and information are promoted hand-in-hand with

Criteria/Issue	A: Business as usual	C: Best case economy and co-operation	D: Worst case economy and co-operation
		energy for productive-end use can be a strategy to ensure economic empowerment of women	energy services.
Forestry Issues - impacts on forestry	Decline in forest resources; rapid deforestation as people look for wood fuel -the supply-demand deficit, which is currently at 56, is continuously growing. -dependence on wood fuel is a major factor and there is need to encourage adoption of alternative energy options	Reduced deforestation; reduced pressure on forest resources	In cases where the number of users of biomass increases, there will be much pressure on forest resources
Forestry Issues - policy options on forestry	Rehabilitation, enforcement of laws and reforestation have all been undertaken to address the situation -strengthening of management mechanisms in the forestry sector as well as capacity building within these institutions is key to addressing some of the problems	Forestry protection laws in operation; management codes in operation; adoption of alternative fuels promoted	Promote conservation skills but also ensure that the communities are aware of the benefits of forests; -promote a forestation and reforestation methods and strategies as well as land-use methods that enable tree planting -promote investments in use of modern energy services and technologies.