CLIMATE NETWORK AFRICA

PROCEEDINGS OF THE WORKSHOP ON ENERGY DEMAND, CDM, NEPAD AND MILLENNIUM DEVELOPMENT GOALS IN EAST AFRICA

22-23 NOVEMBER 2003
HILTON HOTEL — NAIROBI, KENYA

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Abbreviations and Acronyms

ALAF	Aluminum Africa
CCD	Convention to Combat Desertification
CDM	Clean Development Mechanisms
CPAP	Country Programme Action Plan
CSO	Civil Society Organizations
DFI	Direct Foreign Investment
DFID	Department for International Development
EMCA	Environmental Management Coordination Act
ESMAP	Energy Sector Management Programme
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Green House Gases
HDI	Human Development Index
KAM	Kenya Association of Manufacturers
KCJ	Kenya Ceramic Jiko
KENGO	Kenya Energy and Environmental Organization
KFW	
LDC	Least Development Countries
LPG	Liquefied Petroleum Gas
MDG	Millennium Development Goals
MESDA	Multilateral Environmental and Sustainable Development Agreements
MSE	Micro and Small Enterprise
MW	Mega Watt
NAPA	National Adaptation Plans for Action
NARC	National Rainbow Coalition
NEPAD	New Partnership for African Development
NGO	Non Governmental Organization
OPEC	Oil Producing and Exporting Countries
PM	Particulate Matter
R&D	Research and Development
REDI	Regional Development Issues
RET	Renewable Energy Technology
RFO	Residue Fuel Oil
SADC	South African Development Corporation
SHS	Solar Human System
SPM	Southern Paper Mills
TAZAMA	Tanzania Zambia Oil Pipeline
TIPER	Tanzania and Italian Petroleum Refinery Company
TOE	Tons of Oil Equivalent
TPDC	Tanzania Petroleum Development Corporation
UEGC	Uganda Electricity Generation Concession
UNCBD	United Nations Convention on Biological Diversity
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCC	United Nations Framework on Climate Change
VAT	Value Added Tax
WAGP	West Africa Gas Pipeline
WAPP	West Africa Power Poll
WEC	World Energy Council
WEHAB	Water Energy Health Environment Agriculture and Biodiversity

WSSD	World Summit on Sustainable Development
WSSDJPI	World Summit on Sustainable Development Johannesburg Plan of Implementation

Acknowledgements

The planning and implementation of this workshop was only possible through the involvement and contributions of many people from the East African region. We would like to thank them for their valuable contributions. Indeed the work is a synergistic product of many minds. We want to acknowledge the invaluable work of the many men and women who through their commitment to the passion of providing clean, affordable and easily accessible energy to the peoples of the East African region went to great lengths to make the workshop a reality.

We would also like to thank all the participants who discussed with us their perception of energy demand, supply, use and its implications on the environment without whose willingness and effective participation the successful exchange of views would not have been possible.

As the region grapples with economic woes and the debilitating effects of poverty, we will need development partners who not only care but are also willing to go the extra mile and build both institutional and human capacity. We are grateful to find such partners in UNEP and the Government of Switzerland who provided funds to mount this workshop.

The participation of government and the parastatals in this case the Ministry of Energy, Kenya Pipeline Company and the National Oil Corporation shows the extent to which a solid partnership is being built with Civil Society Organizations. We are not only grateful for this but yearn for even more support from government as we work side by side for our people in a common cause.

While it is not possible to identify everyone who contributed in one way or another to this work we would like to appreciate all the resource persons who spent time putting together papers to present at the workshop which generated material for discussion.

Last but not least we thank the Climate Network Africa staff who worked tirelessly to ensure a successful process and product emerged.

December 2003

EXECUTIVE SUMMARY

WORKSHOP ON ENERGY DEMAND, CDM, NEPAD AND MILLENNIUM DEVELOPMENT GOALS IN EAST AFRICA

Introduction

One of the key reasons why sustainable development has not been achieved to the anticipated levels within the East African region is poor access to cleaner domestic and commercial energy. In the domestic sector energy is required for cooking, lighting, space heating pumping water and powering electrical and electronic apparatus. The commercial energy is the prime mover in industry. It is used inter alia, for providing energy for electrical machinery, heating, lighting, air conditioning and transportation, etc.

The East African countries are hoping to achieve rapid industrialization by the year 2020 and are also hoping to provide sufficient energy for the rapidly rising population. This means that the countries of East Africa must provide jobs for the rising population in the hope of reducing poverty. Poverty level in the region is already very high.

Energy Supply in East Africa

The East African countries are endowed with diverse energy resources capable of meeting all their short and long term needs. However, technologies required for extracting and delivering energy to meet the demand for now and the future needs to be critically examined.

Tanzania is endowed with natural gas which could meet the regions requirements for the next 50 years or so. There is great potential for hydro-electricity supply in region, particularly in Uganda and Kenya that if fully exploited could supply sufficient electricity in the long term. There is a possibility of inter-connectivity of the current electricity network in the region to the southern pool to supply sufficient electricity in the region. The East African Oil Refineries at Mombasa could be upgraded to supply sufficient petroleum products for the region. The current Kenya pipelines company pipeline system could be extended to serve the whole of the East African region. So where is the problem?

Meeting the Demand

Could CDM be used to acquire technologies to solve the current and future energy demand? The East African countries are members of the East African Community. There is a need of collective planning for energy demand to meet the current and future requirements of the region. Most of the countries in the region are also members of the Common Market for East and Southern Africa (COMESA). May be COMESA could be used as a vehicle to tap into the current excess supply of energy (electricity and coal) for current shortfall of energy demand.

The East African countries are tied to other treaties and agreements such as the of United Nations Framework Convention on Climate Change (UNFCCC), New Partnership for African Development (NEPAD) etc. The region is supposed to plan according to the Millennium Development Goals (MDGs), yet these initiatives are not fully understood and explored in the region.

Awareness Raising

Community Based Organizations (CBOs) and the Non-Governmental Organizations (NGOs) are best placed to create awareness at all levels in the region.

Climate Network Africa is a regional NGO and an active participant in some of the above mentioned treaties and agreements, hence its active involvement in awareness creation on energy demand for present and future and the implications of this demand.

Conclusion

The workshop came up with a series of recommendations which if implemented could go a long way in meeting the energy demand in the East African region. Some of the recommendations are very important for East African policy makers.

The full report of the workshop is available at:

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SESSION ONE: OPENING

Introductory remarks

Official opening

Address from UNEP

Address from UNDP

Keynote address

Questions/answers

INTRODUCTION AND OVERVIEW

The Energy Demand, CDM, NEPAD and MDGs in East Africa workshop took place on 22nd–23rd November at the Hilton Hotel in Nairobi. Climate Network Africa (CNA) organized the workshop in collaboration with the United Nations Environment Programme (UNEP), Division of Policy Development and Law and the Government of Switzerland. The main objectives of the workshop were to: Examine the present energy situation; analyze implications of the actual energy use and chart a way forward for planning energy supply in the next decade.

Over 65 participants drawn from NGOs, universities, regional and international institutions attended the workshop. It was recognized that East Africa is endowed with a variety of energy resources including biomass, geothermal, hydroelectricity, coal and natural gas. In the area of energy, the three countries could work together in the following areas:

- Investigate the least cost for development and transmission of electric power,
- Efficient exploration and exploitation of fossil fuels
- Utilization of new and renewable sources of energy.
- Carry out joint planning, training and research in the exchange of information on the exploitation, development and the utilization of renewable energy sources.
- Develop an integrated policy on rural electrification.
- Develop inter-partner state electric grid and interconnections.

All such measures to supply affordable energy to the people should take cognizance of the protection of the environment. However several challenges will have to be overcome including the removal of barriers for effective participation of the private sector in energy projects and programmes.

The development of an East African entrepreneurship in the energy sector will drive the process of perchance emancipating our people from the shackles of poverty and its vagaries. Another area of significance will be sharing information on energy resources among East African energy policy makers, researchers and investors. This will also address removal of fears associated with sharing of energy resources, especially electricity (hydro in Uganda and coal and natural gas in Tanzania). It will help to develop mechanisms for forging ahead as a region and discard any sectionalism, especially in international meetings and negotiations.

Development of an East African Energy Master Plan and its implementation will give direction to the future, exploiting opportunities available in technology transfer, as the region has to be fast tracked in conjunction with building institutional and technical capacity in the region. Another breakthrough is set to come from harmonizing national energy policies into a regional policy and targeting it to regional economic excellence and by implication poverty eradication. A potent question to answer in the whole set up is how to make the energy policies and plans gender sensitive with the main objective of addressing problems facing women in energy sourcing and use.

Arising from this workshop is a set of recommendations, which will go a long way in informing policy and also in the development of projects.

Workshop format

The workshop was organized into three main sections:

- Overview of the energy demand in East Africa
- Implications of energy use and the environment
- Regional and national policies and plans to meet energy demand

It was structured into presentations and plenary discussions. Various speakers presented a total of 20 papers. The final session covered recommendations and the way forward.

The workshop was organized in such a way that after each session, discussions would be held, with all the presenters fielding questions from participants and generally encouraging debate on pertinent and emerging issues. This report presents the discussions after a set of papers as planned by the organizers.

SESSION 1: OPENING

This session comprised the official opening of the workshop, which was preceded by introduction of each participant (see list of participants in the annex), address from UNEP, and address from UNDP, a keynote address from Kenya Pipeline Company. What was deemed as a rare occurrence then followed; the guests of honor were humble enough to remain and answer/clarify points of concern occasioned by their speeches. Below is an attempt to recount what was said by each speaker and a record of the discussions that followed.

Opening and introductory remarks

Ms Grace Akumu - Kenya

The Executive Director, Climate Network Africa (CNA) Ms Grace Akumu, welcomed all participants to the workshop. In the introductory remarks, Ms Akumu congratulated National Rainbow Coalition Government (NARC) for being able to encourage and debate on all development issues. She quoted examples of the space the new government was giving to debates, citing the Renewable Energy Conference sponsored by the European Union and the Ministry of Energy, Kenya and the Investment Conference. She challenged the NARC Government to distinguish itself from the previous government by pushing implementation of issues, saying that debates have been clear and discussions conclusive. She added that Civil Society Organizations (CSOs) appreciate the role donors are playing since the NARC government took over. They have made some constructive contributions and some have even backed their intentions with financial contributions.

Ms. Akumu requested the government to continue implementing not only the promises they made but also consider implementing suggestions made by CSOs adding that CSOs pride themselves in having played a major role in bringing about changes in the country but they also feel unhappy that they are not fully incorporated in decision-making.

She, however, acknowledged that the new government has not been in office even for a year and therefore, might need a little more time before a firm judgment about their performance could be made.

After those remarks, she went ahead to briefly discuss the subject of the two-day workshop saying that energy is vital for development and that Africa is well endowed with conventional energy resources such as oil, gas and hydro. She appealed to genuine friends of Africa to rapidly move the continent out of the debilitating and humiliating poverty, by assisting her with the requisite technology and means of developing what she has.

Ms. Akumu said that Africa is the least consumer of global energy resources. It consumes only 3-4 per cent of the total global energy. With regard to green house gas emissions, Africa is also the least emitter and is responsible for only 1-2 per cent of global emissions. The above statement underscores the under-development status of Africa as the more developed an economy is, the more energy it consumes.

She said that the United Nations Framework Convention on Climate Change supports developing countries. She quoted the preamble of that convention to support her fact. She expressed fears that with the current poverty situation in the continent whereby majority live on less than US$ 1 per day, the MDGs would not be met, more so if Africans have to divert the very scarce resources in investing in what they lack.

She added that Africa, in the interest of global cooperation might explore the opportunities available through energy mix. She was glad that the African Union has been vigorously encouraging the incorporation of CSO participation in the formulation and implementation of NEPAD projects and hoped that if the same would continue, then the dispute about ownership of NEPAD would cease.

In her conclusion, she stated that Africans also aspire to develop and move away from primary to modern energy sources. Thus it is the duty and collective responsibility of governments, development partners and CSOs, through initiatives such as NEPAD, MDGs, CDM and others to assist the majority of the African population, to realize that dream.

Official Opening
Mr. Oriaro, (representative of the Minister for Energy)

Mr. Oriaro, the Chief Geologist, gave a speech on behalf of Hon. Ochilo Ayacko. He gave apologies from the Minister for being unable to attend the workshop. He appreciated the fact that local NGOs such as CNA work in partnership with inter-governmental organizations such as UNEP and the Government of Switzerland on vital issues like energy.

He identified petroleum as the most common source of energy followed by electricity in East Africa. He gave an example of the prolonged drought of the year 2000 that highlighted the region's dependence on electricity for commercial activities. He added that the cost of energy had been steadily rising and that it has increased the cost of production, thus making products less competitive in both regional and international markets.

The Minister's representative noted that days of cheap energy, particularly, hydro carbons were gone and the last three decades of the twentieth century taught people hard lessons since the cost of energy and other industrial inputs have escalated, markets have been liberalized and survival of industry has been threatened by structural inefficiencies. He called for the need to plan for the supply of energy through regulations both regionally and internationally to avoid threats of economic survival.

He observed that one of the main priorities of the governments of the East African countries is alleviation of poverty through programmes that generate employment and create wealth for their citizens. He explained that the goal could be achieved by supporting existing manufacturing sectors to increase their current production through provision of reliable and cost effective energy services.

Recognizing the fact that most African governments have committed themselves to the achievement of the MDGs by the year 2015 he said that the provision of quality energy services for eradication of poverty and sustainable development remains a critical challenge. He called for the need to urgently augment energy consumption through integrated national and regional plans to fast track change from high dependency on traditional biomass fuels to more convenient modern energy services.

Mr. Oriaro emphasized that poverty eradication requires total commitment at all levels. He further noted that the East African governments have taken a leading role as the administrators, facilitators and providers of an enabling environment for the private sector to thrive and invest more in viable projects. He appreciated the roles played by NGOs and civil society. He called key players to be actively involved in Climate Change Convention and the Kyoto Protocol

negotiations as well as creating more awareness on available funding sources such as CDMs and how to benefit from such arrangements.

He thanked UNEP, CNA and the Government of Switzerland for organizing the workshop and hoped to get a report of the workshop proceedings. He welcomed participants from Uganda and Tanzania to Kenya and hoped they would get time to enjoy tourist attractions. He then declared the workshop officially open.

Address from UNEP
Dr Bakary Kante, Director, DPDL

Dr. Bakary reminded participants of Africa's extreme poverty and called upon each person to rally behind the MDGs. Stressing this concern, he emphasized the importance of planning to attain the goal of halving poverty by 2015 saying that we had only 11 years to go, yet the work still required to be done was enormous.

Emphasis was also laid on the importance of building partnerships and sharpening one another's knowledge even through such workshops. The government, participants were informed, could not achieve these goals on its own, and must of necessity involve relevant stakeholders. He urged participants to now move on to Type II Partnership that was one of the major outcomes of the WSSD, and further called for partnerships amongst CSOs, NGOs, private sector and other groups.

He noted that energy is an index of development. Alluding to the significant role that energy is set to play in turning round economies in the region, Dr. Bakary called for a new set of ideas that will speed up the process of bringing energy to the rural communities to promote development activities.

He then gave thought-provoking insights into the plight of Africa as a recipient of donor funding and the consequences of maintaining this position. He stressed the need for Africans to take their destiny into their hands in order to change the continent, and reverse the trends or risk moving from poverty to utter misery. He further highlighted painful issues such as ¾ of the world's natural gas being wasted in Africa, and the plight of African countries that have oil. He questioned Africa's extreme poverty against its endowment with myriad natural resources, energy resources being in abundance, both natural and renewable energy resources.

He pointed out the need to enhance the region's research efforts and to feed this into planned development. Dr. Bakary said that UNEP would continue to support capacity efforts for various institutions including NGOs.

While the rich are becoming wealthier and amassing great stocks, Africa is degenerating. He asked pertinent questions such as the cause of all these problems and actions that developing countries should undertake.

He called for more research in the use of solar energy appreciating the efforts being made in Nairobi to use solar energy to control traffic lights at some roundabouts. He also said that UNEP will continue to have its headquarters in Africa.

Dr. Bakary called upon all African countries to work together in NEPAD for their people and create wealth for the continent.

Address by UNDP representative
Mr Charles Nyandiga

In his introductory remarks, Mr. Charles Nyandiga thanked participants for granting him the opportunity to speak at the workshop. He briefly introduced UNDP as the UN's global development network, advocating for change and connecting countries to knowledge, experience and resources to help build a better life. Poverty alleviation was pivotal in UNDP's focus.

Mr. Nyandiga discussed the importance of energy to UNDP's work. He said that supplying safe water would not be possible without energy for pumping, and clean fuel for boiling water. He added that gender equity could not be achieved as long as young girls are withdrawn from school to collect ever-scarcer fuels for family subsistence. He observed that such issues speak of the critical importance of energy as being central to development issues that cut across all sectors and development topics.

He stressed that no country has substantially reduced poverty in modern times without massively increasing the use of modern energy. He advised that for achievement of international and national development goals, such as the MDGs, people must change perceptions and recognize that energy is not simply a sector among many, but is an essential service to a wide range of sectors.

In relation to demand, he said that energy is a derived demand because people do not want energy in itself but the energy services it provides such as cooking and lighting. He said that UNDP supports energy activities through global, regional and country-level projects and programmes and community level initiatives. He listed the energy priorities that were noted during UNDP's Thematic Trust Fund on Energy for Sustainable Development that was launched in 2001. They were:

- Strengthening national policy frameworks to support energy for poverty reduction and sustainable development;
- Promoting rural energy services to support growth and equity;
- Promoting clean energy technologies for sustainable development;
- Increasing access to investment financing for sustainable energy.

He identified some of UNDP's global energy initiatives as WSSD's Global Village Energy Partnership and LPG Challenge. He informed participants that UNDP is in the final stages of developing a CDM manual to build the capacity of both country offices and their clients in the area.

Adding that UNDP is an implementing agency for the GEF of which one of the focal areas is climate change he identified operational areas for projects under the climate change. He also discussed how UNDP operates and integrates those different areas of activities by giving its activities in Kenya as an example.

In conclusion, Mr. Nyandiga wished all participants a successful workshop and fruitful debates on the subject and finally thanked them for paying attention.

Keynote address
Dr. Shem Ochuodho, Managing Director, Kenya Pipeline Company (KPC) Ltd

Dr. Ochuodho applauded the fact that the workshop had come at an opportune time when East African countries were seriously considering how to meet the expected increase in energy demand in the near future adding that the Kenya Pipeline Company was deeply involved in that undertaking.

He said that energy plays an important role in the development and growth of a country and added that East African countries depend mainly on electricity and petroleum products to drive their commercial activities apart from isolated cases such as natural gas, coal and biomass in the form of firewood.

He noted that given the low levels of development and energy consumption per capita, energy demand is set to increase at a higher rate thus provision of inexpensive and reliable supply of electricity and petroleum fuels poses a challenge in the East African region. He appreciated the fact that KPC is very much involved in the overall petroleum products supply network, through transportation of petroleum products from the Port of Mombasa to the hinterland.

Dr. Ochuodho talked about the plans that the Kenya and Uganda governments have to facilitate the delivery of oil products to Uganda, Rwanda and Burundi as well as other landlocked countries, highlighting the role KPC will play in working closely with the governments to ensure completion of the work.

He went ahead to identify future activities of KPC with other parastatals such as Kenya Railways that target improving efficiency in energy supply.

Dr. Ochuodho also mentioned energy issues in relation to environment, gender and poverty and how the former impacted on the other three issues. He also added that he was happy to note that the workshop was set to discuss the implications of energy use among other topics.

He pointed out how the government of Kenya and KPC has installed “common user” LPG importation facility at Mombasa, storage and bottling plants at strategic towns to reduce domestic fuel supply constraints. He encouraged other countries to introduce the use of LPG to reduce environmental degradation occasioned by use of wood fuel.

He noted that even transportation and use of petroleum products also cause enormous pollution and pose other hazards such as fires. He informed the participants that KPC had played a major role in reducing the number of tankers on the road thereby ultimately reducing risks of pollution and hazards.

He adviced that the workshop debates should not only be on commercial energy but also domestic and should cover all forms of energy and how they have a direct impact on our day-to-day lives.

Dr. Ochuodho intimated that he hoped the workshop would be exploratory in nature and would encourage exchange of ideas as well as recommendations on the way forward for the energy sector in the East African region. He requested the discussions to take note of issues connected with CDMs, Kyoto Protocol, NEPAD and MDGs.

He appreciated the fact that all participants had various roles to play in the workshop and called for the need to come up with fruitful conclusions.

After the opening session, the presenters who included Ms. Grace Akumu (CNA), Mr. Oriaro (representing the Minister for Energy), Dr. Bakary Kante (UNEP), Mr. Charles Nyandiga (UNDP), and Dr. Shem Ochuodho (KPC) responded to questions from participants.

Questions

- How far has the Kenyan Energy policy that the Minister promised the people reached?
- What kind of capacity building does UNEP undertake?
- Has the government (Kenya) developed a policy to guide the charcoal industry? Has the government set aside land for tree planting?
- Rural people have no access to clean energy. How do we serve those living below the poverty line?
- Could you tell us why there is no price incentive on unleaded fuel and low sulphur fuel? What is being done to encourage motorists?
- Could the extension of the oil pipeline constitute a CDM project, and if so, how will issues of ownership be since this would imply trans-boundary agreements?
- South Africa has put in place measures to enable the poor access fuel, such as poverty tariffs. What are the governments of East Africa doing to enable the poor access electricity?
- On the way to Turkana district, there are numerous sacks of charcoal for sale by the roadside. How can this menace be reduced?
- How can the people living in dry lands be encouraged to stop cutting down trees?

Responses

The Minister's representative responded that the policy is almost complete. The committee had come up with an initial draft in Nyeri in 2002. This was revised in Mombasa in 2003. The final draft was worked on in Nanyuki about a month later. The zero draft for discussion has been produced. The next step will involve organization of a stakeholder's workshop, which will most likely take place in Mombasa in December 2003. From this workshop, a final draft policy on energy will be produced.

Heated discussions on charcoal policy in Kenya clarified that at the moment the country, and indeed the region does not have one. There are definitely problems pertaining to this issue, which need to be tackled since charcoal is a widely traded commodity in this country. It was pointed out that production and transportation of charcoal are illegal, but somehow Kenyans still manage to consume an estimated 2.4 million tons each year. The Ministry official acknowledged that considering that the charcoal industry was lucrative, it was time the country came up with a policy.

The issue of biomass was also extensively discussed during the plenary session. It was recognized that majority of the people in East Africa are still dependent on biomass. Majority of the poor people have no access to clean energy. It was recommended that the UN agencies, civil society and the government need to work in partnership to solve this problem.

On the issue of cleaner petroleum products, it was pointed out that there is no policy encouraging Kenyans to use low sulphur or unleaded petroleum. Currently, the price on unleaded petroleum is the same as that of premium. An official from the National Oil Corporation clarified that in fact unleaded gas should be more expensive, since it is imported into the country when it is has already been refined. One participant suggested that countries need to do more to encourage motorists to adopt the use of cleaner fuels.

On rural electrification, the government official was asked why some communities and individuals have paid for the service but still do not have access. He informed the participants that the Kenya Power and Lighting Company (KPLC), which is in charge of distribution has been ordered by the government to connect at least 150,000 people annually. This was their target for the year and they would ensure that it is met. The government was aware of the numerous complaints from the public and was working on streamlining the organization.

On the issue of rural energy, the government official pointed out that there is a chapter on this in the National Policy document. This is still an area that needed to be discussed extensively, especially when the draft policy is released to the public for comments. All participants were encouraged to give their inputs.

The role of LPG was discussed, raising issues of affordability. Examples from India and Rwanda on the use of LNG were given with a general sense of the three countries being encouraged to tackle LNG. Participants were informed that a fact-finding mission has been mounted to explore scope for the use of environmentally friendly fuel.

A number of groups in the region it was said were willing to upgrade their fuel. Measures to progressively introduce these new ideas to motorists are in place. Participants called for a study to be undertaken to document the percentage of vehicles that breakdown due to alternative fuel.

Dr. Ochuodho talked of the high standards employed by KPC in any of their undertakings and assured participants of the highest standards in the lake moorings. He cited the environmentally unfriendly mode of transport operating in Lake Victoria in the form of lake barges.

NEPAD's interest in extending the pipeline to Rwanda and Burundi was also discussed, and this gave impetus to the notion of developing as a region, doing things as a region and rejecting sectionalism. Dr. Ochuodho discussed what he called the poor man's solution – putting a point of presence (a depot) on **routes** in anticipation of potential need and growth, but at the same time ensuring the highest standards in handling the fuel. He said that right now KPC is exploring the possibility of having points of presence in Namanga, and Nanyuki. For Nanyuki, which is already connected to rail transport, wagons would be used.

Discussions were also held on incentives to use unleaded fuel, and one of them is maintaining the cars engine in good condition and health issues. A decision was taken in Johannesburg to phase out leaded fuel by 2005 and also to eliminate sulphur in gasoline. This means that compliance is a must for every motorist and the sooner one adjusts the better. Participants were informed that vehicles manufactured from 1993 have all been designed to use leaded fuel and that all cars manufactured in Japan use unleaded fuel. The consequences of lead on the health of individuals were discussed. Studies undertaken have shown brain damage in infants caused by exposure to lead. Exposure to lead is a risk to all mankind, and governments need to educate the public on these issues. Mrs. Mary M'Kindia CEO National Oil Corporation of Kenya gave some clarification on the questions on leaded fuel. She said that the policy is to use unleaded fuel. Pertinent points considered were the socio-economic value of the Mombasa refinery to Kenya, and the knowledge that its continued operation is breaking both the Kenyan law and international conventions. Participants were told that hydrocarbon solar, wind and geothermal reserves had not been explored, and that the major energy for the world today is hydrocarbons. UNEP is currently working with governments to promote awareness on the merits of using clean fuels

Gas flaring in Africa provided food for thought. Africans are living in abject poverty, yet the continent has the highest levels of gas flaring. Participants agreed that Africa should resolve this

issue. Gas projects need to be developed and interconnectivity built amongst countries in the region. The need to work as a bloc was highlighted. Sudan, Ethiopia, and Tanzania are known to have gas reserves and would therefore prove useful in resolving the energy deficit in the region. The gas in Sudan and Ethiopia was said to be of good quality, containing higher quantities of propane and butane. Kenya reported that aggressive exploration campaigns have been mounted in the search for gas and other reserves.

The Chief Geologist, representing the Minister clarified that the government is committed to reducing the tariffs. KenGen had reduced its tariffs from Kshs. 4 to Kshs. 2 and it was hoped that KPLC would pass on this reduction to the customers. The government was also exploring other options of providing cheaper power to the people.

SESSION TWO: OVERVIEW OF THE ENERGY DEMAND IN EAST AFRICA

Commercial energy demand/supply and gaps in East Africa

Domestic energy demand supply and gaps in East Africa

Energy use/supply and international conventions CBD, CCD, UNFCCC

SESSION TWO: OVERVIEW OF THE ENERGY DEMAND IN EAST AFRICA

The session focused on energy demand in E. Africa. The papers presented were: commercial energy demand/supply and gaps in East Africa, domestic energy demand/ supply and gaps in East Africa; energy use/supply and international conventions — CBD, CCD, UNFCCC. First a review and summary of the papers is given followed by discussions held in the plenary session.

Insert Hubert Meena summary here.

Domestic Energy Demand /Supply And Gaps In East Africa: Case Of Uganda Dr. P. Mwesigye

Dr. Mwesigye listed the main sources of domestic energy in East Africa as: wood fuel, that accounts for over 85% of the energy consumption, petroleum products such as kerosene and diesel/petrol (thermal generators) and electricity.

He then gave figures for each country. These are summarized below:

Kenya		**Uganda**		**Tanzania**	
Wood fuel	68%	Wood fuel	95%	Biomass	90%
Petroleum products	22%	Petroleum products	4%	Petroleum products	8%
Electricity	9%	Electricity	1%	Electricity	1.2%
Coal	1%	-	-	Coal and renewables	0.8%
Installed electricity capacity	1,173 MW	Installed capacity of electricity generation	317MW	Other sources	

He pointed out that in Kenya, electricity peak demand is about 800MW, while Uganda's electricity peak demand was said to be about 320 MW.

He also gave an analysis of the overall energy scenario in East Africa, which shows over-dependence on diminishing wood fuel supplies and imported petroleum fuels. He pointed out that the majority of the people in East Africa especially in the rural areas do not have access to modern forms of energy such as electricity, yet wider access to affordable energy services is a necessary condition for meeting the challenge of the Millenium Development Goal of halving the population of people living on less than US$ 1 a day by 2015.

He emphasized the importance of accessing reliable, affordable and socially acceptable energy services, saying that it is a prerequisite to meeting most of the targets outlined in the medium declaration.

Dr. Mwesigye when linking domestic energy to MDG, (to halve extreme poverty), said that access to energy services facilitates economic development and explained how households could develop micro-enterprises that require energy as an input.

He also discussed the issue of having good sources of light to improve on livelihood, thereby making it possible for households to increase their working hours beyond daylight. He said that energy services would improve the income of households and thus reduce poverty.

The presenter dwelt on the fact that energy is a requisite in food preparation, pointing out the fact that 95% of staple foods need cooking before they can be eaten. Other energy requirements in households are lighting, water heating, and refrigeration. Each requirement was linked to an energy source in a rural or urban household. Electricity, for example, is used mainly in urban households.

On environmental sustainability, Dr. Mwesigye said that it would be achieved by improving efficiency and by using of cleaner sources of energy. This will sustain natural resources as well as reduce emissions, which protect the local and global environment.

Moving on to challenges facing the energy sector, he listed the following:
- Dependency on biomass energy sources due to limited access to modern energy sources and affordability.
- Necessity to weigh alternative energy technologies on the basis of affordability and implications for future development.
- Regional coordination and integration being essential to establish equitable access to regional resources.
- Most rural dwellings are scattered and far from modern sources of energy. There will be need to use a mix of renewable technologies to meet the various energy needs.
- Lack of research and development capacity to support decision making on energy.
- Limited funding from governments to meet energy demands.
- The need to introduce new policies and reforms which will improve efficiency as well as encourage competition in the sector.

Dr. Mwesigye identified the following as barriers in increasing electricity access to rural areas:
- National policies and plans that do not deliberately promote the development and use of renewable energy.
- Very limited private and/or public investments in the development and promotion of renewable energy.
- High initial investment costs of renewable energy technologies and inadequate financial intermediate among others.

He discussed ways of meeting energy gaps in East Africa and suggested that promotion of improved cook stoves, charcoal stoves, efficiency in use of electricity, rural electrification programmes and involvement of NGOs will help in meeting the energy gaps.

Needed investments in the sector are geothermal and hydro power generating capacity, electric transmission and distribution infrastructure, LP gas production and distribution, solar energy conservation and efficiency measures. Dr. Mwesigye concluded by acknowledging that the future should contain widespread access to low-cost electricity and gas for cooking.

Harnessing International Agreements For Energy Security In Sub-Saharan Africa
Dr. Evans Kituyi

Dr. Evans Kituyi of African Centre for Technology Studies defined energy security as energy being available in reliable and adequate quantities when needed, accessible (affordable) and acceptable with respect to fuel quality-conservation efficiencies and pollution.

He stated that one of the key reasons why sustainable development was not achieved in anticipated levels in sub-Saharan Africa over the past decade was the poor access to cleaner

commercial energy by the majority of its population. He pointed out that currently, about 80% of the African population depends on traditional biomass fuels for their basic energy needs and added that high urbanization rates has increased the demand for charcoal.

Dr. Kituyi said that as much as significant awareness of renewable energy technologies (RETs) had been raised in many countries in Africa, the key sources of energy for most of the population in sub-Saharan Africa would remain biomass (mainly firewood and charcoal).

He noted that cooking with poor ventilation has significant health impacts such as acute respiratory infections that ranked fourth in the share of the burden of diseases in sub-Saharan Africa. He added that trace gas and particulate pollutants from charcoal production and processes have adverse effects on human health. He gave an example of how carbon monoxide from wood smoke could have an adverse effect on the health of humanbeings.

The presenter further noted that the growth in wood demand by 1.22 million tons between 1997 and 2000 implied a further increase in GHGs with methane as the potent GHG known because of its high Global Warming Potential (GWP).

Focusing on assessing past responses, he added that in many instances, the serious environmental challenges reported are direct consequences of applying narrow specialized knowledge to complex natural systems. He called for the need to address those issues and concerns through integrated scientific efforts that focus on social and ecological characteristics of particular places or regions.

He said that a review of past studies on barriers to cleaner energy revealed that a consistent call for policy reforms, or poor communication of such findings to those responsible for policy and decision-making, was the main barrier. The lack of political will to facilitate the recommended changes has been the underlying cause.

He discussed the potential contribution of multilateral environmental and sustainable development agreements (MESDAs), including the UN Framework Convention on Climate Change (UNFCCC); its objectives and article 4.1c, d & e, the UN Convention on Biological Diversity (UNCBD) and Convention to Combat Desertification (CCD), the WSSD JPI and the Kyoto Protocol and the CDM.

He informed the participants that the New Partnership for Africa's Development (NEPAD) has as its objective securing access to energy for at least 35% of the African population within 20 years, especially in rural areas. None of the MDGs is on energy but energy is necessary in delivering the goals such as goal 4 on reducing child mortality and goal 7 on environmental sustainability.

The presenter identified existing opportunities for governments such as funds for developing National Adaptation Plans for Action (NAPA) for least developed countries (LDCs) in Africa.

He charted out a way forward as noted hereunder:

- Cultivating real political will- from rhetoric to action,
- Domesticating key provisions of MEAs and SD agreements,
- Building capacity of persons and institutions to design, implement, monitor and evaluate projects,
- Installing policy incentives to attract FDI and foster partnerships among civil society, states and business.

Dr. Kituyi concluded that domestication of key provisions enshrined within MESDAs as well as creation of user friendly conditions have the potential to contribute significantly to reducing current energy insecurity in sub-Saharan Africa.

Questions

Below are the questions that participants raised after listening to the three papers.

Why is biomass viewed as a negative source of energy yet it is known that it can be used to generate electricity?

How has Denmark been able to convert biomass to oil? It is important to make a distinction between biomass and electricity, and also to look into cost effective issues.

- How can communities be led to use biomass in a sustainable manner?
- Why is it that most of the presentations do not emphasize the use of biomass?
- How do the markets for the different energy sources in the region work?

Discussions

In answering the questions above, very vibrant and stimulating deliberations were held. Participants were told that biomass as a potential source of energy was not being undermined but the reality on the ground is that the region just does not have the resources or the technology to convert biomass into electricity. If the region puts in place an enabling environment for Foreign Direct Investment, then probably biomass will be converted into electricity, the way India has done.

Emphasis was placed on the need to use biomass in a sustainable manner, especially because 90% of the energy balance is biomass in the form of wood fuel and charcoal. A plan should be put in place driving the shift from biomass in relative percentages to other forms of energy. Energy use is an index of development it was said, and the sector is increasingly being liberalized and commercially driven, the least expensive being set to capture the market. Compared to other forms of energy, the market for biomass is not well defined and its monetary value is still unclear making the sector too informal. There in lies the problem.

The issue of affordability in converting biomass to electricity was further discussed in connection with the sugar industry. Sugar factories in the region do not have sufficient bagasse to produce electricity. Some sugar factories in Uganda produce electricity but this has to be supplemented.

When looking at biomass, one ought also to consider population growth and the intrinsic factors implied coupled with deforestation and desertification. It was agreed that more thought should be given to the biomass problem.

It was also observed that governments tend to put a lot of emphasis on electricity and other forms of energy but do not discuss biomass. Awareness creation on the opportunities and options given by biomass should be created.

Efforts should be made to step up biomass research in the region, and CDM is a mechanism that can be used to fund such initiatives. If biomass has benefited other countries, then it follows that a road map to exploit it should be developed, albeit based on research. Some of the research, it was observed should be on cost-benefit analysis of biogas utilization, bearing in mind that East

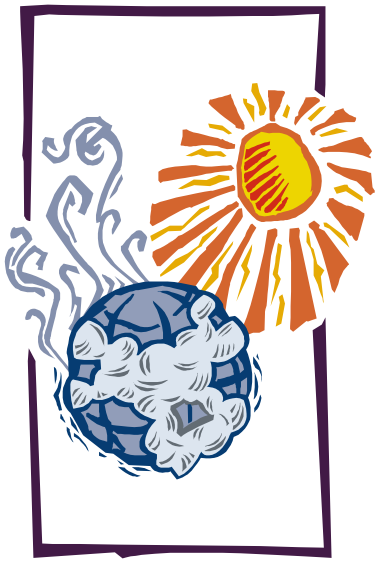
Africa cannot afford electricity and purely depends on biomass. Obviously a lot of work must be done in this area to contain desertification and yet give the people access to affordable energy.

There was heated debate on the fact that harvesting biomass is not entirely responsible for degradation but that other factors such as land-use change contribute even more to the vice.

Below are points that summarize the direction the discussion took.

- Diversify the options for energy and give Africans alternatives, biomass is making people poorer.
- Looking at the matrix of energy resources, biomass belongs to the primary class of energy resources. Emphasis should be on moving from primary to secondary energy resources.
- Policies that embrace the shift to electricity should be put in place and implemented; the use of electricity is more efficient.
- Develop a policy on charcoal.
- Solve the infrastructure aspect of the whole energy sector.
- Consider that the west developed because of commercial energy and choose which way to go.
- Develop a policy on biomass
- The ministries of energy in the region to move from being donor driven to attaining a measure of financial independence.
- Go to great lengths to communicate and share information as a region.
- NEMA (Ke) has put in place a task force to tackle leaded gasoline issues.
- Energy should play its intended and required role; currently it is not. Energy is supposed to be the pillar of development in all countries.
- A greater focus should be placed on hydrocarbons
- How will the region access energy safely and cost effectively?

SESSION THREE: IMPLICATIONS OF ENERGY USE AND ENVIRONMENT



Energy use in the transport sector

Energy use in the industry sector

Energy use in the household sector

Energy use and poverty

Energy use and gender

Energy use and rural communities

SESSION III: IMPLICATIONS OF ENERGY USE AND THE ENVIRONMENT

The session focused on energy use by various sectors in the region. The papers presented were: Energy use in the Transport sector; Energy use in the Industry sector and Energy use in the Household sector; Energy use and poverty, Energy use and Gender, Energy use and desertification, and energy use and rural communities.

Energy Conservation Opportunities In Tanzania's Transport Sector
Eng. Wilson Lugano

Mr. Lugano from Tanzania Industrial Research and Development Organization (TIRDO) noted that the transport sector, which is the biggest means of people's mobility, plays an important role in national economies. Vehicles utilize energy resources, which are bound to be depleted hence it calls for the need for efficient utilization of these resources.

He pointed out that the National Energy Policy of Tanzania (revised 2002) reveals that Tanzania's total energy consumption by sector is distributed as household 89.8%, agriculture 3.6%, transport 3.1%, industry 1.9%, commerce 0.2% and others 4%. The presenter gave out total energy consumption to be over 22 million tons of oil equivalent (toe) out of which 92% is in form of wood fuel and charcoal and the remaining 8% is by the commercial sources comprising hydroelectricity, coal and petroleum products. He pointed out that the commercial energy consumption pattern, which shows the contribution by individual end users is transport sector 40.5%, industry 24.6%, household 18.6%, agriculture 8.2% commerce 2.6% and others 5.5%. Other figures singled out included imported petroleum supply of 90% of the commercial energy while hydroelectricity and coal contributes to less than 10%. Biomass, solar and gas contributes to an insignificant amount.

The presenter explained that Tanzania's transport sector is moderately developed with about 81,895 km of roads, 3,350 km of railways and three main ocean ports of Dar es Salaam, Mtwara and Tanga and other minor ports in the ocean and lakes. Two international airports at Kilimanjaro and Dar es Salaam and over 50 smaller fields are also included. He said that road transport stands out to be the leading mode in terms of coverage and volume of goods traffic handles.

Mr. Lugano said that transport consumes about 400,000 metric tons of diesel, petrol, aviation gasoline and jet kerosene each year and at the same time the sector is a major contributor to the GDP.

The presenter said that cars and trucks pollute the air during manufacturing, oil refining and distribution, refueling and most of all when in use. He identified major air pollutants from motor vehicles as ozone (O_3), particulate matter (PM), nitrogen oxides (No_x), carbon monoxide (CO), carbon dioxide (CO_2), sulphur dioxide (SO_2) and general hydrocarbons (HCs).

He clarified that ozone is beneficial in the upper atmosphere while at ground level it is the primary ingredient in the smog and it irritates the respiratory system.

Mr. Lugano added that in Tanzania, agricultural practices are the major producers of green house gases (GHG). He illustrated using a table the GHG inventory for Tanzania (See Annexes).

He identified typical characteristics of motor vehicles based on research as proportion of motor vehicles; vehicle makes and conditions thereof, roads condition and roads congestion, vehicle maintenance and driver's behaviour.

The proportion of motor vehicles was obtained in percentages of cars as 46.81%, buses 7.94%, good trucks 29.17%, motorcycles 10.80%, tractors/earth movers 2.71% and trailers 2.57%. He further noted that the proportion of diesel-propelled vehicles was 55.32% whilst that for petrol was 44.68%.

With respect to motor vehicle makes and condition, he said that most vehicles are imports with Japan as the major supplier with 74% of all vehicles surveyed. He added that 54.76% of all motor vehicles under research were imported as new, 22.39% as used and 22.85% as reconditioned while 95% of motorcycles were imported in new condition. He further pointed out that based on statistics, Tanzania was becoming a market for cheap second hand vehicles.

Switching to the conditions of the roads and road congestion, he pointed out that most of the interviewed vehicle operators admitted that they usually traveled on poorly constructed roads. He identified that about 97% of motor vehicle operators agreed that road congestion was increasing and it had an effect on fuel consumption and time of travel.

Motor vehicles maintenance was mainly oil servicing as reported by the presenter and he added that major vehicle repairs were done on breakdown. He noted that the vehicle life, road safety and vehicle fuel consumption are dependent on the driver's behaviour since the driver controls the operating characteristics and environment of the vehicle.

The presenter reported that the transport sector is the major consumer of petroleum fuels whose importation entails use of huge financial resources; furthermore, the petroleum fuels used in the sector are a predominant source of air pollution. He revealed that energy conservation opportunities in the sector could be achieved via these main approaches namely;

- Urban land use planning – improvements in transport sustainability could not occur unless land users are arranged so that they could be accessible by ecologically sustainable transport modes.
- Use of advanced automotive technologies to improve the efficiency and emissions of vehicles.
- Improved petroleum-based vehicles
- Improved petroleum-based fuels and use of alternative fuels that reduce emissions to the environment.
- Materials which are being examined for alternative and advanced vehicles such as light weight metals, plastics, ceramics to mention but a few.

He noted that enforcement is mainly geared towards fuel efficiency or less environmental pollution, pointing out that transport management techniques need to be evaluated and restructured timely to cope with changes in traffic conditions and road systems. Mr. Lugano identified the techniques as increasing road capacity, improvement of the public transport, provision of one-way streets, parking prohibition, staggering hours of activities, road pricing and linking traffic signals.

Energy Use In The Industrial Sector: East African Perspective
Mr. Peter Orawo

Mr. Orawo gave an overview of the energy sector in which he described the consumption patterns of commercial energy in the Great Lakes region. He said that the majority of the region's population still relies on bio-fuel as their primary fuel source while commercial energy resources include coal, hydroelectricity, geothermal, and possibly some oil. He said that oil prices in the region have significant impact on local economies, since the area is heavily dependent on oil imports.

He said that in the Great Lakes region, oil consumption averaged about 84,000 barrels per day in 2001, almost all of which was imported. As noted by other speakers, kerosene is used extensively in rural areas for lighting and in urban areas, for cooking and lighting. Mr. Orawo explained that countries of the region are attempting to discourage the use of wood fuel through joint provision and promotion of the use of liquefied petroleum gas (LPG).

He also highlighted the fact that the three East African countries have no known oil reserves and relied on imports for all their needs. He gave specific examples of ongoing efforts in each country on oil prospecting. These can be found in the annex. The presenter also discussed the issue of pipelines and especially the plans for an oil pipeline from Eldoret in western Kenya to Kampala, Uganda. He said the extension would be constructed over a four-year period, under the auspices of the EAC at a cost of $80 million, and would supply Uganda, Rwanda, Burundi, northwestern Tanzania and eastern Democratic Republic of Congo, and is expected to cut the price of oil in Uganda by almost half. Also alluded to was the Tanzania-Zambia oil pipeline, which the two countries are considering privatizing.

It was noted that there are only two oil refineries in the region both of which have had a number of problems and have been operating below capacity. The oil refinery in Tanzania has virtually been closed following liberalization of the country's petroleum industry while the Mombasa refinery continues to perform below expectations.

Mr. Orawo discussed the importance of natural gas and said that although natural gas is not produced or consumed in the region at present, several projects have been identified for expanded use of this resource. He said that in Tanzania, a project to exploit natural gas in the country's largest known field on Songo Songo Island located in the Indian Ocean southeast of Dar-es-Salaam will soon be entering its final phase of development. The power generated by the gas plant will be fed directly into the national grid.

He informed participants that Tanzania is the only country in the Great Lakes region with significant coal resources. He said that the total recoverable coal reserves in the Lake Victoria region amounted to 220 million tons. He noted that the primary use of coal in the region is in the generation of electricity. It was reported that Kenya is prospecting for coal.

The presenter then gave a brief overview of the status of electricity in the region. He said that the total electricity consumption was 8.7 Bkwh and that the three countries are developing plans to share power supplies, including a regional energy interconnectivity plan that will enable any EAC country to connect with another nation's electricity supply. Mr. Orawo said that Uganda has the biggest hydropower potential and would play a major part in any power-sharing project. He gave details on electric expansion projects in Kenya that are set to augment the country's electricity supply. He also discussed the problems plaguing the Tanzania Electric Supply Company (Tanesco). Of interest was the agreement Tanzania, Kenya and Zambia have entered into to implement cross-border electricity trade, a two-year project estimated to cost over $153.5 million. He said that the project will entail the construction of 372 miles of power lines from Zambia to Mbeya, and from Arusha to Nairobi. Given its connection to the SADC power grid, Zambia will

be able to sell low-cost and reliable electricity to Kenya and Tanzania. Mention was also made of Uganda's plans to export more electricity to Kenya following the completion of various projects being undertaken to upgrade its energy sector.

Under renewable energy, Mr. Orawo gave examples from Kenya, including the Olkaria renewable power station and the Kipevu Thermal station. He said that Kenya currently produces about 1.0 bkwh of geothermal power, nearly 30% of net electricity generation. He also talked of efforts being made in the solar energy sector.

Mr. Orawo then discussed energy use in industry in each country. He noted that most industries in the region use outdated technologies that do not encourage energy conservation and in effect lead to increased GHG emissions and energy waste. He said that a number of factories operate below rated capacity hence lowering overall efficiency especially in Uganda.

Mr. Orawo made reference to the Marshall plan that resurrected Europe after World War II likening it to NEPAD. He said that the energy sector is the cornerstone of NEPAD and that NEPAD offers the greatest opportunity for integrating Africa's energy systems e.g. planning integrated grids and cross-border pipelines to enhance trade. He went on to say that energy is of prime importance for economic development in Africa and that NEPAD intends to use energy as a launching pad for Africa into the global economy. Reflecting a deep understanding of how all this will work out the presenter gave examples of power projects that will be used in the short term to achieve sustainable energy development.

He said that enhancing efficiency in industry is commonly much less expensive to incorporate in the design process in new projects than as an afterthought or retrofit. He then gave examples of some of the technologies that the region's industries can adopt for energy efficiency, cleaner production and eventual abatement of GHG emissions. He listed nine known kinds of processes that enhance energy efficiency and cleaner production: Fuel switch, co-generation, bioethanol production, afforestation, cement production and dry technology, recycling, use of natural carbon dioxide, energy conversion and end use efficiency, and lastly typical energy efficiency program. Detailed information of each example can be found in his paper in the annexes.

Alleviation Of Energy-Propelled Rural Poverty: An Entrepreneurial Approach
Prof Henry M. Bwisa

Prof. Bwisa gave definitions of poverty as defined by Webster's World Dictionary as:

- A lack of resources for reasonably comfortable living
- The condition of being poor; indigence; need
- Destitution and want-imply such great poverty that means for mere subsistence such as food and shelter are lacking
- Penury-suggests such great poverty as to cause misery or a loss of self-respect.

He said that around the globe there are two billion people who live in those various degrees of want including lack of access to reliable, affordable and environmentally acceptable modern energy services who are primarily the rural populations of developing countries.

Prof. Bwisa reckoned that without energy, even the most basic of community services and infrastructure cannot exist and investment and income opportunities would be stifled. This would perpetuate the vicious cycle of poverty.

He gave reasons why energy is a pre-requisite to rural development. These include:

- Enhance opportunities for learning, education and access to information
- Enable use of tools and machinery needed for increased productivity
- Allow the flow of essential services in remote areas and
- Remove the drudgery of manual labour in many simple household tasks
- Facilitate food processing, heating and lighting

He concluded from the above points that energy can improve the quality of life and well being of people.

He classified rural industries as agro- and non-agro industries, saying that the former would consist of facilities such as those for tobacco curing and grain milling while the latter would include charcoal and brick manufacturing facilities, potteries, bakeries and blacksmiths.

The presenter said that general information and knowledge gives the impression that in most developing counties the use of energy for entrepreneurial (income-earning) activities is lacking or minimal. He gave examples as beer brewing, boiling sugar from cane, pottery, tobacco treatment and baking to list but a few.

He observed that for Bangladesh landless families, annual per capita consumption for all kinds of cooking and food preparation was found to be 6.9 GJ/year as early as 1982, of which 6.6 GJ was for domestic cooking while the remainder (0.3GJ) was for boiling rice and sugar syrup according to the World Energy Council (WEC).

He pointed out that general information has it that in those rural areas where there are increases in rural electrification and greater availability of other commercial energy sources, a steady transition from traditional to commercial energy sources is found. He singled out that high level of commercial energy consumption by village enterprises in China is an example of that trend.

Switching on to rural households and energy, he said that more than half the world's population lives in rural areas of which nearly 90% — some 2.8 billion — live in the developing countries. Prof. Bwisa observed that the vast majority of these people are dependent on the traditional sources of energy, which barely allows for the fulfillment of the basic human needs of nutrition, warmth and light.

He pointed out that most energy in rural areas is used for residential purposes, predominantly cooking and that energy in itself may not be a basic human need but it is critical to the alleviation of hunger. He added that addressing rural domestic energy problem is incomplete without mentioning the rural woman/girl child who spends up to five hours gathering fuel for cooking a day's meal. He explained that since household energy is primarily women's responsibility, they would be the direct beneficiaries in any improvements or diversification in choice of energy. Ironically, men are also indirect beneficiaries of access to modern energy forms. He observed that having access to sufficient amount of good quality energy could contribute to reducing household's vulnerability.

Prof. Bwisa advised that rural empowerment would imply, in part, increased cash income within the household since this is an important factor in reducing vulnerability. He said that energy could improve women's earning by helping free up their time and by powering their enterprises. He explained how access to appropriate energy could act as an opportunity or a constraint on rural entrepreneurial activities.

On policy-implied issues in rural energy development, he argued that in developing countries, one would hypothesize that governments do not have enough resources to deliver while the private sector might say that there is no market for it, no capacity to pay and no profit in it. He recalled further that according to WEC, the poorest 2 billion people in the world use 0.2 toe of energy per capita annually, whereas the billion richest use 5 toe or nearly 25 times as much. Thus as a first principle, reaching out in poverty alleviation should mean sustainable lifting up not leveling down.

He said that the World Bank's Energy Sector Management Assistance Program (ESMAP) has undertaken several studies in rural energy systems planning and implementation and conceptualized an "income pyramid" in rural areas of developing countries. He explained that the top small segment of the pyramid is labeled as consisting of those who can afford to pay for applicable energy systems and to whom commercial transactions are possible, the larger middle segment is seen as one that needs financing and/or other forms of temporary assistance and finally there is the large base of the poor people who cannot afford to wire their homes even if power grid is to be availed nor are they able to maintain solar home systems during batteries replacement.

He recalled that in the past, a number of forms of support have led to shortcomings in the entire process of creating sustainable energy development in the developing nations. He outlined the following:

- Some programs have affected the rural energy market and discouraged private sector players, which happens particularly when high levels of operating subsidies are given without proper targeting and least cost analysis.
- Some programs are primarily dependent on government execution with no commercial participation. This displaces private sector initiative and limits delivery capability to government itself.
- Limited target market assessment and participation. This is particularly evident in the case of some technology-driven approaches.

He lamented that no single way forward seems feasible and even viable and therefore the answer should be vested in concerted effort.

He identified factors that might be given further thought as providing a way forward. They include:

- Rural energy development modes where innovative approaches and unique forms of intervention are thus required.
- Assessment of market trends, which include predictable energy supply, which is affordable. The energy supply must lead to productive uses and support from government or donors to the poor.
- Creation of entrepreneurial farmers to involve moving resources from areas of low to areas of high productivity; innovative methods of using resources.

Prof. Bwisa concluded that the paper should be understood to advocate for a gradual rural transition to more modern energy systems. He said that the paper recognizes that traditional fuels can be managed in a more sustainable way while at the same time improving the lot of rural people. He added that the paper focused on energy supply as a poverty alleviation tool but it has to be noted that energy alone would not be enough.

He recommended that the developing world has what she needs to solve her energy problems. He observed that the problem could not be solved if policy makers shut their eyes on local potentialities. He gave out the recommendations as stated hereunder:
Stopgap measures, which include:

- Subsidizing energy provision to rural areas
- Establishing rural energy generation funds to assist rural energy acquisition
- Economically empowering rural communities to acquire necessary energy technologies. Empowerment might take the form of markets and good prices for their agro-products.

Permanent measures identified included:

- Establishing incentive schemes for innovations in delivery of energy services that meet rural needs.
- Mandating and facilitating public research institutions to invest in research in appropriate energy technology.
- Establishing incentive schemes for communities with innovations in the area of energy provisions.

Energy Use In The Household Sector In East Africa
Mr. Otiti

Mr. T. Otiti from Department of Physics, Makerere University, Uganda, stated that the share of energy use in the household sector in sub- Saharan countries is very high compared to the other sectors in the region. He added that the socio-economic impact of energy use in the household sector depends on quality of energy use while the type and amount of energy used is influenced by the fuel availability, sustainability, household composition, income and socio-cultural aspects.

He demonstrated using a table as indicated below the types of energy used in different sectors in Uganda (1994)

Sector	**Biomass**	**Petroleum**	**Electricity**	**Total**
1. Household				
Urban	3.3	0.1	0.9	4.3
Rural	130.7	0.3	0.1	131.1
Sub-total	134.0	0.4	1.0	135.4
2. Industrial	7.1	0.9	1.2	9.2
3. Commercial	4.3	0.5	0.6	5.4
4. Institutional	3.4	0.2	0.3	3.8
5. Transport	0.0	0.4	0.0	0.4
Sub-total	14.8	2.0	2.1	14.9
Total	148.8	2.4	3.0	154.2

He noted that biomass energy in the form of firewood and charcoal remains the most common fuel for cooking in most East African countries since it is a free source of energy despite its inefficiency and harmful impact on human health.

He described cook stoves in the urban areas as portable charcoal burning stoves made from scrap sheet metals obtained from discarded motor vehicles or used bitumen drums. Mr. Otiti reported that the open fire used in rural areas and portable stoves were inefficient. In the last 30 years various projects and programmes have improved the efficiency of the stoves. He quoted the urban stove programmes in East Africa; the Kenya Ceramic Jiko (KCJ) charcoal burning stove

initiative. In Uganda he quoted Uganda Ceramic "Sigiri" (UCS) which was initiated by a workshop organized by Kenya Energy and Environment Non-Governmental Organizations (KENGO) that invited interested members of the Uganda Non-Governmental Organizations.

He went ahead and identified the improved cook stoves in Tanzania as Morogoro charcoal/wood stoves, *jiko la* Dodoma, *jiko bora* and coal stoves.

He said that kerosene is used for lighting in rural and urban areas, where it is also used for cooking. He appreciated the fact that in rural areas, artisans have fabricated cheap but very efficient kerosene lamps.

The presenter then noted that electricity is mainly used in urban areas for cooking, lighting and powering TVs, radios and refrigerators but not in rural areas where the bulk of the poor are dispersed in rural settlements.

He justified that because of the dispersed nature of the households and low power requirement in rural areas, the region has been perceived to be an ideal place for deployment of photovoltaics (PV) electrification that would be cost effective and environmentally sound.

He revealed that opportunities exist to reduce the cost of solar home systems (SHS) in the near future through outlook for ready decline in PV module prices on the international market, the savings possible from judicious use of locally-made and/or locally assembled components as well as the economies of scale in procurement, sales and servicing that an enlarged customer base can provide. He added that all these needed adequate financing geared to low- and middle-income households.

He reported that recent studies carried out by the Uganda Government with the assistance from ESMAP/World Bank have shown that self or private electrification using diesel generation, car batteries and solar PV systems are common in Uganda. He observed that the trend showed reasonable demand and willingness to pay for electricity services in rural areas.

Mr. Otiti noted that the principal environmental impact of energy systems to indoor climate is pollution, which poses a risk to human health. He said that biomass makes no net contribution to atmospheric carbon dioxide if produced and used sustainably to allow growth. On the negative side, he said that bioenergy could cause serious environmental damage if feedstocks are not properly managed and conservation technologies are inadequately controlled.

He pointed out that kerosene adds significant amounts of CO and unburned HCs, which caused indoor pollution that is hazardous to human health.

He concluded that energy use in households is dominated by biomass energy for both rural and urban areas with charcoal being used in urban households while firewood is used in rural households. He called for the need to improve on the efficiency of household devices.

Questions

Questions asked include:

- Are renewables going to drive development in Africa?
- How can the region make an ideological leap into a regime that is energy sufficient?
- We are predominantly poor. Is the presenter right in stating that we do not have a maintenance culture?
- How can you have a Marshall plan when you are totally dependent?

- How can we make money and still protect the environment?

Discussions

Interesting discussions were held after the presentations. The effects of the *matatu* strike in the transport industry in Kenya were still vivid in most participants' minds and therefore provided a unique reference point that shed light on the ramifying hold that energy has on our daily lives. The need to educate industrialists on the NEPAD, MDGs, CDM and other global mechanisms was also highlighted noting that they are not interested in high level meetings and complicated vocabulary. Their main focus is on the amount of money they can make. This therefore poses a challenge to governments to try and integrate the private sector into such dialogue and action plans. Of importance was the claim that the transport sector causes more pollution than the industrial sector. Obviously this may be subjective and therefore debatable. Participants contended the point raised about black people having no maintenance culture and argued that this was not true but that most people are constrained financially but would like to implement maintenance plans. Co-generation was also debated and most people felt that co-generation in the region is mainly put in place to clear off bagasse and not to generate electricity.

Another point of contention was the idea of developing a Marshall plan. Some participants thought it was a good idea while others thought it a farce, considering the economic inabilities of the countries. In this regard, a warning was sounded on the erstwhile interest of countries in the west purporting to help Africa. However it was agreed that the region should learn lessons from one another and also from elsewhere and where possible use Marshall-type of planning in the quest for energy.

Discussions also featured around the globalization plan, affirming the need for Africa to step up her efforts or risk being left behind to languish in poverty. It was noted that the West is not going to assist Africa on points that concern and are of interest to Africans but on what they themselves select. For example, the European Union sponsored energy meetings in Africa and Europe while the WSSD ignored energy.

Even though all the Environment Management and Coordination Acts in the region have in-built incentives for industry, a great deal still needs to be done. Most industries and MSEs in the region have not embraced cleaner production principles.

The following points were raised:

- Cleaner production is not the end but the beginning of sustainable development
- CDM is not a panacea for all ills
- Learn lessons from other countries such as Brazil who have managed to cut down the oil bill by 20% by using bio-ethanol. Europe has no ethanol sources but purchases from this region.
- The region should endeavor to make huge savings in fuel
- Governments should give incentives for buying new vehicles, encourage people to buy locally assembled vehicles and tax old vehicles heavily.
- The CDM skeptics were told to watch out because global buyers want data on cleaner production before they purchase anything from East Africa.
- Ponder on poor conversion technologies. For example, one ton of charcoal is produced from 18 tons of wood. Research on growth of trees with less ash content and on trees that are good for charcoal ought to be conducted.
- Develop an attitude of preventive maintenance in industrial research is now ongoing.

Energy Use and Desertification
Ms Isabella A. Masinde

Introduction

Ms. Masinde raised pertinent issues on land degradation/desertification, which is currently estimated to affect about 3,600 million hectares of the world's total land surface. Pointing out that about 16 percent of the world's agricultural land is affected by soil degradation she said that desertification directly affects, or puts at risk, the livelihoods of more than a billion people. In Africa alone, an estimated further 5-6 million hectares of productive land, often-marginal land, has to be opened up for agriculture every year just to offset the effects of degradation.

The root causes of desertification were examined and noted to be highly complex as well as site specific, but the driving forces often involve adverse climatic conditions in combination with social, political, economic and cultural factors that strain marginal lands beyond ecologically sustainable limits. The presenter singled out firewood consumption and explained its effects on land saying that it is a significant contributing factor to desertification. Indeed, as economic growth becomes sluggish, revenues continue to decline, and the problems related to conventional energy use continue to increase. Fuel wood consumption throughout Africa is increasing. In addition, rapid population growth and urbanization create even more demand for energy in its cheapest and most accessible form, that is, fuel wood. (See detailed paper, which gives figures of consumption patterns). Further discussion revealed that desertification is usually accompanied by desiccation and drought, and has serious economic and social consequences. It was also noted that it contributes significantly to climate change by increasing greenhouse gas emissions.

The role played by energy in the interrelationship among environment, development and population was extensively discussed bringing out the vicious cycle that begins with the use of fuel wood used to generate energy in an inefficient and unsustainable manner. It was pointed out that in the past decade, a significant number of countries in Africa experienced economic decline; and that these same countries have experienced cyclical droughts for the past two decades coupled with poor soils, repeated pest invasions and resulting agricultural losses. These problems in turn contribute to rapid urbanization, as rural populations migrate to urban areas. The rapidly growing urban centers then consume even more fuel wood than the rural areas.

Ms. Masinde discussed the impact of population growth and rural-urban migration on the environment and gave statistics that signify the importance of these issues. She said it is imperative that in these countries, appropriate energy policies be adapted if environmental disaster and all its ensuing consequences, both economic and social, are to be averted, especially as the demand for fuel wood is far greater than the supply.

Basing her presentation on real issues on the ground Ms. Masinde informed participants that a large percentage of the land that was cleared between 1990 and 2000 in Kenya was to satisfy the charcoal demands of Nairobi, Mombasa and other large towns. A smaller percentage was attributed to development and wood.

She also discussed environmental impacts and consequences of deforestation and land degradation describing their severity. These basically include ecological instability, loss of agricultural production, desertification, climate change, and loss of biodiversity. The devastating consequences of deforestation are amply described in the main paper, which is annexed to this report.

She noted that in East Africa, land degradation is the single most important factor preventing sustainable crop production and that the combination of land degradation, drought, and desiccation poses nearly insurmountable problems.

Also illustrated were the clearing of forests and the burning of firewood, which were said to add to the amount of carbon dioxide in the atmosphere. Recently, it has become clear that the amount of carbon dioxide deposited into the atmosphere from forest cutting and burning and from certain soil management practices is approximately one third the amount generated by fossil fuels.

Touching on the wider impact of deforestation and land degradation she said that they also contribute significantly to the loss of biodiversity. Sounding an alarm Ms. Masinde observed that if current trends continue unchecked, human activities such as firewood collection might soon have irreversible impacts. These impacts include species loss, habitat loss, declines in the variety of genes within a species, and overall decline in the number of species. These losses will affect the production of pharmaceuticals and medicines, biotechnology, and food security, among other things.

The impact of these processes on women and children was clearly given noting the increase in women's workload and suffering as a consequence of having to walk longer distances in search of fuel wood and other forest-based products essential for survival.

The presenter observed that in some districts, when fuel wood is not available, women shift to alternative and sometimes inferior fuel, for instance, animal dung and crop residue. These fuels not only take longer to burn, they also produce hazardous fumes. The use of dung also deprives the soil of nutrients needed for agricultural production. Lack of fuel wood sometimes forces women to reduce the number of hot meals their families receive.

Hardships related to dwindling supply of water were highlighted. It was noted that like fuel wood gathering, water collection is also becoming more difficult as water sources are depleted. Women spend up to four hours per day collecting water for the home and the farm, often carrying 20 litres or more in containers on their backs, shoulders, or heads.

Using fuel wood to cook, it was pointed, out has negative consequences for women's health, particularly when the stoves are inefficient. The confined spaces and poor ventilation cause, women to inhale smoke, including toxic gases. The smoke also causes eye irritation, and respiratory diseases and the extreme heat has negative effects on skin**.** A project by ITDG-EA in Kajiado district revealed that improved stoves and ventilation led to improved health of women and children who were previously suffered from respiratory diseases.

A dismal picture was painted of the effects of fuelwood shortages and how they extend far beyond the individual family, producing a chain of reactions affecting the nature of rural society, its agricultural base, and the stability of its environment. The presenter observed that as fuelwood becomes scarcer, substitutes such as straw, dried dung, rice husks, and even plant roots are utilized. Whether these materials were previously used to feed animals or to restore nutrients to the soil, there is a major loss to the food production system. The land becomes impoverished, and there is a lack of nutritious food needed; women and children often lose out because of social customs that put them last in line for food, which may result in malnutrition.

Other consequences of desertification were also discussed such as the creation of pressures to migrate, either to other countries or to urban areas within their own countries. When the situation is particularly severe, especially when it is accompanied by an extended period of drought, the

result may be the displacement of a large number of people, now often called "environmental refugees." The author said that the consequences of environmental breakdown reverberate through society in decreased birth rates among displaced populations, higher infant mortality rates, and a great deal of personal distress.

In conclusion the presenter submitted that an adequate and efficient supply of energy is fundamental to sustainable development and economic growth in the developing countries and that the energy needs of the developing countries cannot be met from conventional sources, due to the prohibitive costs involved and the lack of the requisite financial resources in these countries. This, therefore, means that ways and means have to be explored of ensuring the sustainable use of fuelwood, complemented by the use of other types of renewable energy and the adoption of energy-efficient technologies. To guide in developing mitigating measures she gave the following suggestions:

- Sustainable fuelwood use can be achieved through the creation of woodlots and the increased productivity of natural forest through proper management, thus reduce the burden on women in terms of the time they spend gathering fuelwood. Women will have more money because of what they are not spending on fuelwood, which is used to enhance the quality of their lives including supporting their children to attain education, especially the girl-child. Thus, through the sustainable management of fuelwood resources, not only are the women provided with an easily available resource, but their quality of life is also enhanced and the quality of the environment is improved.

- New developments in technology also facilitate the transition to more efficient energy, and ensure a better demand for management while enhancing the quality of life for women. In Kenya, improved charcoal stoves, which require a relatively small investment, have contributed to reduced use of fuelwood as they are more efficient in burning and retaining energy. The smoke emission is considerably reduced. This has the effect of reducing the amount of trees needed for charcoal and firewood production, thus, reducing the pressure on the resource base.

- In most developing countries, there is the need to create a conducive policy environment to ensure conservation of energy and better demand management. Current energy policies do not provide any incentive for conservation in that energy prices are mostly subsidized. There is a need to allow market forces to determine the prices for energy (including fuelwood and charcoal), for it is only when these commodities are valued at their real market prices that action aimed at curbing demand will be taken by consumers.

- In addition, there is the need to look at incentives to encourage such practices. This has been adequately demonstrated in the developed world. For instance, in the United States, demand management techniques are used in the utility sector, including regulatory provisions that reward the companies for investing in energy efficiency. Energy tax policies have also successfully curtailed demand for gasoline in Europe. Such deliberate policies are instrumental in restricting demand or promoting the use of more sustainable supply sources.

Ms. Masinde acknowledged that energy services for domestic and industrial purposes are a fundamental prerequisite for development and developing countries possess the type of resources that, if adequately harnessed, will supply the energy requirements of these countries in a sustainable manner. Through the sustainable use of such resources, improvements can also be

made in the quality of life of women and children, while enhancing the quality of the environment. The energy sector represents a significant economic activity and source of employment in most developing countries. Improvement in this sector will, therefore, impact positively on their economies. Thus, developing countries need to embrace comprehensive energy policies that reform the current situation in that the economic, social, and environmental gains are tremendous and will go a long way toward improving the quality of life of the present and future generations.

Energy Use And Gender
Dr Beatrice Khamati-Njenga

Mr. Charles Kirubi on behalf of Dr. Beatrice Khamati Njenga, a consultant in Energy, Environment and Development, presented the paper. He began by saying that NEPAD is supposed to provide a new opportunity for developing Africa. The sectoral priorities identified by NEPAD include energy, which by itself cuts across all development sectors as a service.

The presenter argued that despite its shortcomings, NEPAD could be interpreted to support energy needs of the poor, especially women and girls. Focusing on women and energy in Africa, he recalled that in the last two decades, women have been viewed as destroyers of natural resources through their harvesting of biomass for energy. However, more recently, some people view women as the saviours of natural resource management through their superior traditional knowledge. Mr. Kirubi said that there is evidence that development interventions targeted at women have a positive impact on families, especially on children's health and education.

He observed that although women in African countries may not be significantly poorer than men, the apparently "level" status is achieved by women having to work at least twice as hard, and for much longer hours than men. Time and effort spent by women in subsistence and economic chores is an indicator of quantity and quality of energy available. He said that energy poverty is associated with time burden, drudgery and heavy workloads, poor sanitation and air pollution, all leading to overall poor welfare for women and children. Mr. Kirubi added that research indicates that reducing time burdens of women could significantly increase household incomes and productivity of labour and capital.

The presenter went further to say that women's energy concerns have generally been invisible at national level, but where they are recognized, they are often limited to energy for cooking. At continental level, as seen from NEPAD, invisibility remains and energy is mistakenly assumed to be gender-neutral.

He defined gender as the social differences between men and women, which are learned and not necessarily biological. He added that gender roles are determined and prescribed by strongly held cultural and religious traditions and are subject to change in response to changes in socio-economic circumstances, technological development, and education.

Mr. Kirubi stressed that one universal aspect of gender roles in Africa is the subordination of women and men in most societies. Addressing gender in development is generally about improving the situation of those disadvantaged by their "gender contracts," without necessarily changing the roles.

He added that gender inequality has to be seen as a part of broader issues of social, cultural and economic inequalities. Gender, as he said, is not just a binary condition but is graduated by

affluence and poverty, caste systems and other cultures and traditions. Not all women are poor and not all the poor are women.

The presenter said that both male and female members of society are equal stakeholders in energy development and use and concepts in gender and energy draw from the recognition of the right of both male and female to influence and control their own lives.

Mr. Kirubi recalled that the traditional approach to energy development and planning has assumed gender neutrality, which NEPAD also reflects. It has assumed that a good energy policy, programme or project would benefit both males and females equally. He added that traditional approaches view communities in terms of households rather than men, women and children or any other social-cultural distinctions in the households.

He observed that in the conventional energy paradigm, women have not necessarily been excluded intentionally or their energy-related activities overlooked; they have simply been defined out of the energy sector. It happens that participation of women in energy is overwhelming at the small-scale, traditional level hence their relative exclusion. He further noted that poor men are also subject to similar exclusion because they cannot afford entry into larger-scale energy-use sector.

Presenting on practical versus strategic gender needs, he clarified that the former arises immediately from gender division of labour e.g. in rural areas, where women's tasks always involve fetching firewood or cooking, there follow immediate needs such as improved cooking stoves, and easier access to better quality fuel. The latter refers to those things necessary to change the balance of power between men and women in society; they rest on the idea that one gender is subordinate to the other and involves strategies to change this.

He noted that NEPAD has limited recognition of gender as a major issue in development and in fact does not mention the word more than three times. He argued that however, if people have decided to embrace NEPAD in spite of its shortcomings, they must make it work for them.

He further noted that NEPAD requires a re-interpretation of its statements, appeals and planned actions. He advised that in some cases, corrections need to be made, in cases where statements demonstrate a critical misunderstanding of gender that is likely to lead to continued invisibility of women.

Mr. Kirubi said that as a key concern of NEPAD, poverty must be seen in its true gender-colour. It is well documented that SAPs for instance, which NEPAD views favourably, played a major role in increasing the numbers of poor women.

He said that some of the NEPAD goals (Article 68) provide examples of how energy investment could be directed to improve the lot of women, which include using energy to do the following:

- Improve education opportunities for girls and women;
- Power health facilities;
- Provide health education on maternal and child health;
- Develop innovative reproductive health systems for under-served rural areas.

He went ahead to identify some articles of NEPAD such as Article 83, 154 and 155 that had objectives that could be used to improve the status of women through sustainable energy supply and use.

Switching to gender analysis of energy needs, he appreciated the fact that NEPAD supports needs assessment at local levels. He added that in order to address needs for men, women and children, needs assessment must include gender analysis. Mr. Kirubi commented that emphasis in energy planning for the benefit of women has long concentrated around cooking, with firewood collection but a proper analysis of women's workload often reveals quite different priorities. To illustrate further, he used a case study on time and energy expenditures in rural Zimbabwe as an example (See annexes).

The presenter said that gender analysis involves seeking to understand the differentiated development needs and pre-dispositions of men and women. It enables an understanding of the existing gender situation, before and after intervention so it involves information gathering on social-cultural roles and activities of men and women in households and communities.

Focusing on women in energy careers, he pointed out that gender approaches in energy development and planning are intended ultimately to raise the visibility of women — their needs, capacities, views, roles and so on in the energy sector. He recommended that in achieving that objective, it would be necessary to increase the opportunities for gender sensitive women and men to be involved in all aspects of energy at all levels.

Energy Use and Rural Communities
Mr. Daniel Theuri

In his introduction, Mr. Theuri observed that energy is an important prerequisite for rural and national development and noted that the quality and quantity of energy use determines the standard of living of peoples and communities all over the world. He said that there is a strong correlation, for example, between electricity use and standard of living. More intensive energy inputs are required for increased productivity of human labor and for income-generation. However, the production and use of modern forms of energy and biomass have serious environmental consequences.

Mr. Theuri reminded participants that in rural areas energy systems are linked to almost every aspect of rural development and way of life. Considering that the bulk of the population lives in rural areas, he argued that it is then fitting to give due attention to rural areas and their energy needs. The universal trend on provision of adequate and modern energy to citizens is the driving force in addressing rural areas. It is also instructive to note that energy planners and policy makers have neglected rural areas for a long time.

He said that rural areas in Kenya like several other low economies are characterized by the following:

- A population density directly proportional to the land carrying capacity.
- People tend to mainly engage in subsistence energy – that tend to impoverish them more.
- That energy is mainly biomass energy as firewood and other biomass like agro- waste used by about 93% of the population.
- Charcoal production as trade commodity for urban dwellers.
- Kerosene reaches 92% of all households but at escalated costs.
- Energy collection and preparation is a major chore for women and the girl-child
- Other energy services are procured at very high cost and there is no security of supply.
- There are serious health issues associated with traditional energy use mainly from indoor air pollution.

- Fetching of water and energy is estimated to draw the heaviest of human energy in rural households.

Mr. Theuri gave an analysis of energy use in rural areas of Kenya. He used a study undertaken on Kenya's energy demand, supply and policy strategy for households, small-scale industries and service establishments by the Ministry of Energy in 2001. The study provides the following insights into the rural energy scenario,

1) Both traditional and conventional energy types are used in rural areas depending on levels of household income. Poorer households use greater quantities of traditional fuels while higher income families tend to widen their choice of fuel mixes.

2) Firewood: Close to 89% of rural households reported regular use of firewood with an average per capita consumption of approximately 741 kg per annum.

3) The major source of firewood is increasingly shifting to on-farm sources (84%) with the trust lands (8%) and gazetted forests (8%) reducing their importance. One significant observation is that approximately 76% of households obtain all their firewood free while 17% of households regularly purchase. Seven per cent supplement their free collection by purchasing some firewood. Firewood is mainly used for cooking and space heating.

4) Charcoal: Charcoal is a major fuel of the rural; areas and is used by approximately 47% of the population nationally representing 82% and 34% of urban and rural households, respectively with a per capita consumption of 156 kg in urban areas and 152 kg in rural areas.

5) Total charcoal consumption was 2.4 million tonnes (67 million 36-kg bags), representing an annual business of approximately Kshs 17 billion at a weighted price of Kshs 261 per bag. This is about 53% of the 1998 bill for imported oil. Some 40% of this amount is spent at source in rural areas with the balance being accounted for by transport and marketing at the end-use.

6) Farm residues: Overall, about 21% of households use farm residues, but their use is mainly in rural areas with 29% households as compared to 0.5% in urban households. The annual per capita consumption is about 435 kg and 351 kg for rural and urban areas respectively. The continued use of farm residues compromises opportunities to improve soil fertility.

7) Wood Waste: Only 2.5% of households reported using wood waste, a decline from 5.1% noted in the 1980 Beijer Institute study. This is attributed to shortages of industrial wood. Use is mainly in urban areas by 3.7% of households as compared to 2.1% in the rural areas. The consumption is about 15,600 tonnes, estimated from industrial by-product production (sawdust, timber rejects, off-cuts etc).

8) Kerosene: Kerosene is used by approximately 92% of all households (rural – 94% and urban – 89%), mainly for lighting. The annual per capita consumption at the household level is 90 litres in urban areas and 41 litres in rural areas indicating that urban household's consumption is double that of rural households due to its use for cooking in the former.

9) Modern energy in the form of Liquefied Petroleum Gas (LPG) and electricity are rarely used in rural areas. LPG is only used by 1.8% by rural households while electricity reaches only 3.8% of rural households

Focusing on rural energy, the presenter said that rural areas hold a lot of promise playing a role in the economic recovery of the country. However, he noted again that it is strongly felt that the energy planners and policy makers have neglected rural areas in Kenya for too long. The areas hold a lot of potential in terms of un-met demand, small scale investments in energy related or energy consuming industries and marketing of energy products and services. He pointed out that the bulk of the population lives in the rural areas, which are characterized by poor or lack of basic infrastructure to support development and social transformation. He explained that the challenge of improving the rural energy situation revolves around the following issues:

i. Improving access of the rural population to commercial energy such as liquid and gaseous hydrocarbon fuels for basic needs, as well as income generating activities

ii. Promoting diverse options for rural electrification, including decentralized systems, and developing as well as promoting innovative financing mechanisms for such energy systems; and

iii. Improving service and maintenance skills. In this regard, modernization of energy can play an important role in helping to not only meet the basic energy needs in rural areas but also raise the productivity of rural areas. Provision of modern renewable energy, for example, holds potential for specific and modular end uses, which promises attainment of higher social returns.

Participants basically agreed with Mr. Theuri that rural areas have been neglected by planners for long and deserve special attention. He highlighted the over-dependence on unsustainably produced biomass energy, which even though inevitable, continues to conflict with the ecological functions of tree cover in the land. He noted that rural areas are also associated with higher incidence of poverty and sparse settlement, which is not conducive to energy distribution. Mr. Theuri summarized the critical issues facing the rural areas and its energy requirements as being:

- Modernization of energy services.
- Reducing over-dependence on biomass.
- Improving access to commercial liquefied and gaseous fuels.
- Diversifying the energy choices.
- Expansion of rural electrification.
- Developing and supporting rural energy markets.
- Addressing the harmful effects of indoor air pollution.

He said that of immediate interest is the need to assess the scope of energy supply services to the rural areas, identify key constraints and challenges to the provision of energy in the rural areas and develop special programmes aiming at the rural areas.

The presenter briefly discussed the impact of rural energy on the environment. He noted that the over dependence by approximately 92% of the population on biomass energy creates immediate environmental problems. He said that the removal and unsustainable harvest of biomass from

rural areas has four main impacts: denying the soil the organic carbon and thus contributing to decreasing yields with its associated ills, the release of GHGs from biomass combustion has serious impact on global balance of GHGs, soil erosion with its attendant consequences, serious indoor pollution with health impacts especially on the mothers and children below the age of five.

Addressing the challenges to improving the rural energy situation, including modernization of rural energy services, Mr. Theuri outlined the following actions, which he said could give direction both in the short and long term:

- Securing a policy priority at the national level for rural energy modernization and removing urban bias;
- Improving access in rural areas to commercial liquid and gaseous fuels;
- Enlarging energy choices for basic needs, such as cooking and lighting;
- Promoting diverse options for rural electrification, including decentralized systems;
- Developing rural energy markets;
- Financing decentralized energy systems;
- Improving service and maintenance skills; and
- Integrating energy advances with other aspects of rural development.

He maintained that among the options and strategies to improve rural energy situations includes promoting sustained programs of investment in decentralized energy schemes based on renewable energy for rural areas not connected to grids when such schemes are cost effective and enhancing skills and training to manage such skills in rural areas amongst others

The presenter asked participants to read his paper, which contains more details on linkages between the five areas in the WEHAB document. He said that any positive interaction between energy and the other four pillars of sustainable development would create not only a production means but also income generating activities and jobs.

He concluded his presentation by calling for deliberate and immediate action to move rural energy from subsistence to modern forms that would improve the people's capacity to move out of poverty. He said that the impact of poverty in the African countries demands innovative financing mechanisms. Policies should also be dovetailed to respond as priority on energy balance and modernisation in the rural areas.

Questions and discussions

Participants applauded all four presenters for the excellent papers presented but had a few issues to raise. They cautioned the use of theories and models saying that the gap theory of the 1970s has since been disproved lending credence to the need to be extra careful in adopting any of these superfluous theories that have not undergone the test of time.

Some participants were of the view that animal dung is not inferior to other sources of energy and can generate quality energy. It was also said that slurry is better manure than raw dung. Another point that was widely debated was the notion that firewood is a causative agent of poverty. This was said to be false and that the driving factor was use coupled with behavioral patterns and not the product as such. An example of production of electricity (49 MW) running on sawdust was given saying that whilst most countries in the region throw away their sawdust others are producing energy from it. Embroiled in this argument was the issue of refugees. For example in

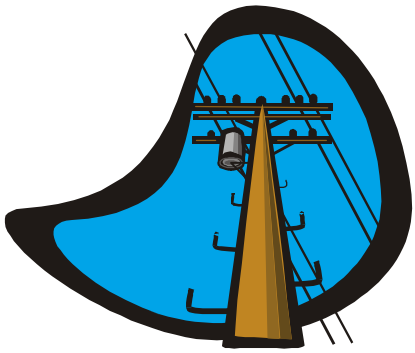
Kakuma Refugee Camp it was reported that the population was responsible for depleting the meager resources in Turkana district, a land that is already arid and in dire straits.

Also discussed extensively were energy efficiency techniques and the use of renewables. The argument boiled down to a need to harmonize policies such as the population and energy policies and also to put in place an aggressive policy on tree planting. This brought to mind the campaigns in the region in the early eighties such as "*kata mti – panda mti*" which witnessed a resurgence in greening the region.

Moving from rhetoric to action also occupied the discussion time. It was felt that the problem was not lack of ideas or innovation but translating all this talk into useful and meaningful actions on the ground. Recommendations to give incentives to the private sector should be made as an avenue of implementing all the ideas people have in order to provide energy to the rural poor. Facing governments and insisting on being given support was seen as a way out of some of the problems we have. The revival of the East African Community provides another window which should be exploited to influence policy, especially policy that will favor the participation of the private sector in the development and provision of affordable and readily available energy. Information on the profitability reduction of inputs should be availed to the private sector. The workshop agreed that a lot of lobbying must be carried out to shift mindsets on these issues. Questions left lingering in people's minds were; how much does energy use actually contribute to desertification and what exactly is the correct definition of a rural area?

DAY TWO

Regional and national policies and plans to meet energy demand



WSSD, politics of energy and policy implications

Energy supply and NEPAD

Energy and MDG

Energy supply and COMESA

Energy supply and EAC

CDM and energy demand

Recommendations

REGIONAL AND NATIONAL POLICIES AND PLANS TO MEET ENERGY DEMAND

The session consisted of a recap of the previous day's deliberations, which was ably done by Dr. H. Kaane. Six papers which included; WSSD, politics of energy and policy implications; Energy supply and NEPAD; Energy and MDG; energy supply and COMESA; Energy supply and the E.A. community; CDM and energy demand were also presented.

The recap helped to put into perspective the direction the workshop had began taking and was especially beneficial to those who for one reason or another had not benefited from the previous day's work. It is included in the report as an annex.

Below is a summary of the papers presented.

WSSD, Politics of Energy and Policy Implications
Ms. Njeri Wamukonya

Ms. Njeri Wamukonya in her introduction recalled that energy featured as one of the key sectors at the World Summit on Sustainable Development (WSSD). She said that in recognition and support of the NEPAD Energy Initiative, the WSSD in its Plan of Implementation, advocates partnerships and initiatives to support Africa's efforts to implement NEPAD objectives on energy.

WSSD identified a number of concrete activities under Type II Partnerships, some of which are presented in the table below.

UNEP	Global Network on energy for Sustainable Development
World Bank	Global Gas Flaring Reduction Partnership
European Commission	Energy for Poverty Eradication and Sustainable Development
UNIDO	Development Strategies to Promote Rural Energy Systems
US EPA	Clean Fuels and Vehicles Partnership
World Bank UNDP	Global Village Energy Partnership
French Development Agency	Mechanism for the development of renewable energy and energy efficiency in developing countries
UNDP, World LP Gas Association	The LPG Challenge
ESKOM	African Energy Legacy Projects
ESKOM	Sustainable African Public-private Partnerships for Infrastructure Development (SAPPID)

The presenter explained that the WSSD process was preceded by the formation of the WEHAB agenda (water, energy, health, agriculture, biodiversity) at the proposal of the UN Secretary General. The WEHAB has identified the major challenges as accessibility, energy efficiency,

renewable energy, advanced fossil fuel technologies and energy and transport. She observed that the extent to which WEHAB would survive into the future was not clear. Some parties proposed that the WEHAB issues be incorporated into an annual programme of the CSD. At the CSD meeting in 2003 an agreement of a work programme for the next 15 years was made. Given the generally non-binding nature of the process and its outcomes it is difficult to determine what will be accomplished on the energy front.

Ms. Wamukonya noted that even though renewable energy received significant attention at the WSSD it was however of a polarised nature. There were significant efforts by some parties to get agreement on targets against some strong opposition from other parties. Eventually no targets were adopted. In reaction to this the like-minded group created a 'coalition of the willing' involving over 30 countries interested in advancing the renewable energy agenda. This group has since identified some strategies to implement their goals. In addition the German government proposed to hold a renewable energy conference in June 2004. She said that as a run-up to this, the Danish government held a conference in September 2003.

To shed light on some of the issues in the energy sector, the presenter spoke about energy politics. She said that these are largely politics of trade since energy is the engine for growth and the economic systems are intractably linked to the energy systems. She pointed out that in general, energy politics have been largely almost synonymous with oil politics. This is attributed to the inflexibility of most economies with respect to dependence on oil and the distribution of oil resources, disparities in per capita consumption and demand across regions and countries. The USA per capita consumption (2001) was 341.8 million btu compared to 6.9 m btu in Angola.

Observing the fact that oil politics is not the only energy politics, the presenter pointed out that the increasing concerns for global warming renewable energy politics, nuclear politics and the hydrogen economy have taken important shifts. Power politics have also been gaining a lot of attention. Agreeing that energy production and consumption are the major contributors to climate change, she said that in this regard environmental issues are becoming intertwined with energy. Green politics is therefore gaining favour even though the manifestation of the politics differs across the different issues.

Reiterating what other presenters had said Ms. Wamukonya highlighted the predominance of oil in the energy sector and the high dependence of the economies on oil that makes importers vulnerable to price changes and policies limiting production. She said that it is projected that the Persian Gulf will remain an important and dominant source of oil for the foreseeable future as it has the world's largest reservoir of untapped oil. Since most of the oil in this region as well as most other oil producing countries remains under state control, state politics have had significant implications on the oil market. Saudi Arabia has the largest known crude oil resources (about one fourth of the world total) and has the capacity to meet developed countries' demand. She said that Saudi Arabia is therefore being encouraged to open up the oil sector to the private sector to enable investment for increasing production.

The presenter told participants that increased production is expected from Nigeria, Angola, Guinea Bissau, Equatorial Guinea, and Sudan. Nigeria and Angola are predicted to have the highest potential and will be producing about 3.5 m b/d and 1.9 m b/d in 2010 respectively. She then discussed the external pressure that these countries are witnessing to further open up the oil sector for private industry. She regretted that overall production from Africa remains sub-optimal due to inadequate investment in infrastructure and political tension.

Ms. Wamukonya said that the threat of running out of oil was the initial rationale for promoting renewables. *A blueprint for survival* (1972) she observed, predicted that oil resources would be exhausted by year 2000. Noting that the climate change debate has turned attention again to renewable energy she said that the greening energy has become attractive to environmentalists with the developing countries becoming important targets. She pointed out the prediction that in future most of the increase in energy consumption will be in developing countries. If the energy mix remains the same as today, the level of emissions from these countries will not be insubstantial. Environmentalists hence advocate renewable energy as the solution. Renewables are not only site specific but given the context and service the costs can be quite prohibitive. Advocates of renewables argue for levelling the playing field with conventional technologies. It is however vital to understand the basis for such levelling. Comparison between renewables and conventional energy sources should be done on service basis rather than technology and this should constitute the basis for levelling the playing field. This is in line with the widely acknowledged fact that energy is in itself not important; rather it is the service derived from the energy that the consumer needs.

She also discussed definitions of what constitutes renewables. This was quite important because participants had been debating this issue for a while in the plenary looking at the exclusion of hydropower in some cases and the extent to which biomass is renewable. The presenter said that the use of the term modern biomass is being advocated in place of traditional biomass. However even then the definition remains loose. She referred to the Goldenberg and Suani definition of modern biomass as 'biomass produced in a sustainable way' as opposed to traditional biomass, which is defined as 'biomass produced in an unsustainable way and is used as a non-commercial source'. She said that what constitutes renewable in the case of hydro is based on size. Hydro faces varying size restrictions with some countries defining acceptable levels being less than 5 MW, others less than 10MW, and others 15MW. She pointed out that certain European countries eliminate hydro altogether from the list of renewables. Geothermal is sometimes considered as being not strictly renewable. The term 'new' is now added as a prefix to renewable implying restricted definition of what constitutes renewables. However there is no universal understanding of what constitutes 'new' renewables.

She said that developing countries have been encouraged and supported to establish renewable energy agencies as conduits for implementing renewable energy objectives, which are often donor-funded.

Noting that industry has shown interest in promoting renewables she however pointed out that most of this is limited to particular technologies manufactured or disseminated by the respective industry. Solar technologies have been the primary focus. BP for example, generated revenues worth over USD200 million in 2000 from solar technologies.

Bring the discussion closer home Ms. Wamukonya said that in Africa reference to renewables is almost synonymous with solar PV and in particular the solar home system. However the extent to which these systems can be considered renewable is questionable. Evaluation of the whole lifecycle indicates that these systems generate emissions.

Saying that the market for renewables is largely in developing countries, she explained that this is mainly because the energy system in developed countries is already in place while it is underdeveloped elsewhere. Hence Africa and other developing worlds are the main target markets for renewables.

She also briefly discussed the hydrogen economy and nuclear energy politics. Issues of power politics were given some thought by the presenter. She said evidence shows that developed countries economies are closely correlated with electricity consumption.

Ms. Wamukonya defined policy implications for East Africa, noting that East Africa will hardly influence global energy politics. It lacks the necessary energy resource and its consumption levels make it a price taker. This notwithstanding, she observed that the developed part of the energy system largely mirrors that of a developed country with high reliance on petroleum fuels for the transport sector and industry, and an electricity-driven service sector. She said that the energy system remains relatively underdeveloped and hence there is room for consideration of alternative paths. Noting that the region is experiencing energy sector reforms among other macro economic reforms she said that any policy making and planning would ignore this at its peril.

The presenter observed that the main challenge for East Africa and Africa as a whole is to design policies and strategies that can be implemented within the prevailing global institutional, political and financial context. Globalisation has resulted in the concentration of financial, technological and military powers. These dynamics need to be taken into account if policies are to be implementable.

She strongly emphasized the fact that a focus on provision of energy for economic growth is imperative if the goal of poverty alleviation is to be achieved. She said that while the overall goal may be universal provision of modern energy, resources are limited and priority should hence be given to energy services for wealth creation. She reinforced that it entailed the integration of policy development and planning. Hence in practice energy policies and plans should be negotiated with stakeholders. They should be undertaken in close cooperation and collaboration with other sectors as well as with the private sector.

Switching to the growing foreign private sector dominance, the presenter noted the threats, especially to countries where access to modern energy services remains rather low. She highlighted the importance of social and environment contracts for poverty alleviation. She called for players in the sector to be morally bound to the society. Though local private sector is not by default more responsible, the potential for commitment to local society is likely to be relatively high. Hence policies to support participation of local private sectors should be implemented.

Agreeing with the mood of the workshop participants, Ms. Wamukonya said that policies and plans need to take into account that none of the countries can survive in isolation in the increasingly globalised framework. She said that regional approaches to energy service delivery and economic development offer the most feasible opportunities for poverty eradication. As such it is not enough to pledge regional cooperation, this has to be complimented with strategic plans within an environment of political will to implement. She explained that this entails establishing regional task teams to design the plans and policies and providing the forums necessary to realise this agenda. She said that these teams would however need to get inputs from the country cross-sectoral plans prepared by multi-sectoral task teams. The task teams should comprise of all stakeholders including NGOs, researchers and private sector.

She went on to say that a closer review of the notion that East Africa and Africa as a whole lacks capacity reveals that capacity does exist and that what lacks is proper mobilisation of this capacity due to a variety of factors including political restrictions. The academia for example has well trained personnel who rarely engage in the macro development affairs. Notably there generally tends to be set boundaries across different actors such as government and academia or

NGOs. As a result she said the region tends to unnecessarily depend on expatriates. She said that a shift in thinking on the availability of local capacity is vital for sustainable development.

Time not being on her side; Ms. Wamukonya quickly elaborated on NEPAD saying it is a framework within which cross-regional activities can be undertaken. She said it is therefore useful to feed sub-regional strategies, plans and priorities into NEPAD.

Insert summary of Aduda's paper here

Energy and Millennium Development Goals in East Africa
Mr. P.N. Mbuthi

Mr. Mbuthi from the Ministry of Energy noted that each day, millions of people worldwide make decisions that determine how energy is used and the quantity needed at any given time. Such decisions pertain to movement from one place to another, production and supply of goods and services, haul freight, heating, cooking, lighting and so on. In all these cases, energy serves as the means to the end.

He said that sustainable development is a dynamic concept built on three pillars, namely economic growth, ecological balance and social progress and then he defined sustainable energy development according to Ogunlade, 2002 as energy that will provide affordable, accessible and reliable energy services that meet economic, social and environmental needs within the overall development context of the society for which services are intended, while recognizing equitable distribution in meeting those needs.

He explained that energy use facilitates all human endeavour, as well as social and economic progress. The magnitude of energy consumed per capita has to a great extent become one of the indicators of social development, nevertheless the strategic and environmental consequences of energy consumption patterns have been neglected for a long time, especially in countries where people have continued to pursue supply policies to satisfy energy needs without paying due attention to the social, environmental, economic and security impacts of its use.

He said that from a poverty point of view, energy services constitute a sizeable share of total household budget in the East African Region, like many other developing nations and up to one third of a household's income goes to energy. He added that people living in poverty pay a higher price per unit of energy service than any other group due to time, labour, economics, health and social inequity. Therefore, improvements of access to energy and energy efficiency could have considerable potential to reduce poverty incidence.

On the Regional Energy Development Issues, Mr. Mbuthi submitted that the great energy challenge in East Africa is how to ensure access to secure and reliable energy services to all citizens, at affordable costs in the face of growing imbalance of energy supply and demand coupled with scarce financial, human and institutional constraints.

He maintained that energy use is linked to a range of economic and social issues including: income, investment, environment and poverty alleviation and observed that with the continued reliance on the traditional low quality energy, the overall standards of living correspondingly remain low. Also, energy production, transmission and consumption produce adverse environmental effects.

The presenter added that without energy as a factor of production, there could be no economic development and no means of maintaining the material and social infrastructure of the society. Energy contributes to the net product of the national economy, provides employment and is closely inter-linked with all other sectors of the economy. In Kenya, more than 1600 persons are directly or indirectly employed in the sector. Arising from this, the energy sector contributed 2% of the overall national taxation revenue, representing 4% of the GDP in 2001. Thus sustainable development has to address social and economic and environmental well being.

On the other hand, he added that the access to secure, reliable and affordable energy services through socially acceptable energy use technologies are associated with increased opportunities for local employment, thus in a way address the poverty question. In order to achieve rational energy utilization, the international community has called for strategies for better patterns of energy production and use.

He explained that modern forms of energy empower people in many ways: by reducing drudgery, increasing productivity, transforming food, providing illumination, transporting water, fueling transport, powering agricultural and industrial processes, cooling or heating room and facilitating electronic communications and computer operations. Adequate energy dramatically increases capabilities and opportunities thus an integral part of poverty alleviation and environmentally sound social and economic development

He said that the relationship between energy and HDI has profound implications for the strategy for poverty alleviation thus the importance of vigorously scrutinizing how a rural energy technology distributes benefits, if rural energy systems are to be instruments of sustainable rural development.

Mr. Mbuthi stated that since the environment and natural resources form the backbone of the regions economies and livelihoods of her citizenry, ensuring environmental sustainability and sustainable use of natural resources is very critical to economic development, poverty reduction and achieving the MDGs. He recalled that with respect to energy, the poverty-related outcomes of WSSD were formulated to obtain certain objectives as outlined in annexed report on his paper.

He quoted that poverty and scarcity of energy services go hand in hand and exist in synergistic relationship thus to reduce poverty and improve standards of living, energy services must be dramatically augmented. He stressed that in the Johannesburg Plan of Implementation, the need for integration of the three components of sustainable development was emphasized.

While taking cognizance of the unsustainable patterns of consumption of production and consumption, and within the framework of WSSD Plan of Implementation, it was agreed that the issue of production and consumption patterns be integrated into suitable development policies including poverty reduction strategies.

Mr. Mbuthi identified that the Agenda 21 which is an important precursor to MDGs, addresses energy sector with respect to various themes. He recommended that one of the ways of promoting sustainable development is to reduce the adverse effects on the atmosphere from the energy sector.

He explained that with respect to the environment, the combustion of energy, particularly fossil is associated with the global warming impacts of greenhouse gas emission. It has also been estimated that between 11% and 20 % of deforestation in developing countries can be attributed to charcoal production. In addition, there is evidence to suggest that charcoal production to meet

urban demand does contribute to forest depletion especially in the arid and semi-arid lands (ASAL). The present consumption of 2.4 million tones per annum in Kenya, for instance, is clearly not sustainable with current practices, which pose a threat to the environment.

He said that the greatest challenge was whether or not East African countries would be able to achieve the MDGs by 2015. On its part, the United Nations agencies have positioned themselves to play their vital role in enabling member states to develop and implement programmes, which integrate the national development needs and MDGs and identified the entry points in areas of (1) Implementation, (2) Monitoring, (3) Research and (4) Advocacy.

He observed that capacity building at the local and national levels will be an inevitable ingredient for enhancing a country's human, scientific, technological, organizational, institutional and resource capabilities and in the context of energy and MDGs, aiming at enhancing the ability to evaluate and address the crucial questions related to policy choices and modes of implementation among development options.

He said that the goal to be achieved by any energy system is sustainable development; the goal for rural energy system must be instruments of sustainable development. The stress on equity means that rural energy systems must first and foremost promote poverty alleviation and improved living conditions of the poor measured by HDI.

Mr. Mbuthi recommended that the governments in the region have to foster closer working partnerships as well as strengthen their institutions. A number of initiatives are already in place where governments may commit themselves to work in close partnership with NGOs, private sector and civil society.

He added that addressing energy and poverty linkages is a critical factor in reducing poverty and increasing economic opportunity. There remains a weak point in the region's member countries' national development and poverty reduction strategies. The Kenyan experience may be handy to elaborate some of inherent weaknesses, which need to be addressed. With reference to three strategy and plan documents namely: PRSP, Economic Recovery Strategy and National Development Plan 2002 - 2008. These documents have in some instances underestimated some problems in reducing poverty and increasing economic opportunity.

He observed that from the Kenyan context that it has been a common practice for recommendations particularly from studies and surveys, among others not ultimately implemented or followed up. In many instances, especially here in Kenya, such reports have often ended up abandoned, thus not justifying why resources had to be spent in financing the activities. In such cases the economic efficiency and justification to undertake such activities looms into serious question. He recommended that such trends need to be put to a halt.

In conclusion, he remarked that the region might need to internalize the efforts by external agencies in the bid to implement international agreements. For instance, as a region, people need to take cue from such institutions as the United Nations, which have already set in motion elaborate programmes and strategies to help countries implement the MDGs. Consistent with this, Kenya through the UNDAF and through the Country Programme Action Plan (CPAP) have identified thirteen target outcomes from the proposed action plans to implement the MDGs. He said that out of the foregoing, energy intervention would contribute directly to three out of the thirteen outcomes, namely:

Outcome 1: increased access to basic social services; **Outcome 11**: effective community-based management of natural resources; and **Outcome 13**: expanded opportunity for sustainable production and income diversification.

He finally recommended that the region should adopt a proactive approach, especially in the concerted implementation of the millennium development goals.

Energy Supply And Comesa
Dr. Samuel Baker Kucel

Dr. Kucel from the Department of Mechanical Engineering, Makerere University, Uganda remarked that the Common Market of Eastern and Southern Africa (COMESA) was established as an organization of free independent sovereign states, which have agreed to cooperate in developing their natural and human resources for the good of all their people. He identified the member countries of the organization and went ahead to state the aims and objectives of COMESA.

He illustrated comparison in energy consumption by member countries of COMESA as well as their different demands on different energy types.

He agreed to the idea that there is a positive relationship between growth in energy consumption and economic growth, social development, and improvement in the quality of life and the environment. Energy affects population growth, gender roles and the promotion of women, under nutrition and food, education, poverty and distribution of wealth, job creation and employment, water availability and so on.

He singled out the suggestions that could be used to improve energy supplies of the COMESA region, which should be practiced, by the individual countries as listed hereunder:

- Good policies, e.g. decentralization, providing political stability which encourages investments
- Privatization, including liberalizing of the energy markets and regulation of the energy sector
- Encouraging innovations in the use of renewable energy, e.g. small hydro, solar, and wind in very remote and rural areas
- Promotion of energy audit and energy conservation, e.g. having a good database on energy and use and improvement in efficiencies of conversion, transmission and end use
- Provision of subsidies to potential investors in the energy sector to encourage investors
- Capacity building to produce experts in energy systems design, policies and issues.

Focusing on the possibility of having a regional grid, he urged the participants to consider a notion of having in the COMESA region an electricity market where the allocation of electricity supply is decided by the market, a cross-country network of suppliers and consumers selling and buying according to demand and availability of supply free of individual government intervention. In that respect he listed the following factors that should be considered;

- Distribution of electricity sources are very different from pattern of demand for electricity
- Accessibility of electricity- most rural people do not have access to the national grid
- Individual countries have different priorities
- Political attitudes and political stability of the country supplying electricity
- Electricity supply network would be vulnerable to sabotage
- The pricing for electricity

In his conclusion, he noted that the development of the economies of the COMESA countries would definitely depend on the energy sector. This means that COMESA countries must massively expand their energy supply systems in order to promote and maintain economic growth. Finally he said that introduction of a common electricity market for the COMESA region might pose some challenges but there are good reasons for supporting an integrated regional electricity supply network.

Energy Security in East Africa
Mutesigwa Maingu

Mr. Maingu gave a general introduction to energy security as it relates to transport, infrastructure, indigenous production of energy sources, grid interconnection and preservation of the environment

He also looked at the energy balance in terms of the following

- The main energy resource categories i.e. primary and secondary sources
- Supply as in imports and indigenous resources
- Demands from Agriculture, mining, industries and loss from conversion processes

Other broader topics considered under introduction included:

- Basic energy policy –key point is increasing use of energy from secondary source
- The study on the East Africa Power Master Plan
- The Tanzanian rural electrification master plan that is under study with focus being tariff structure
- Grid interconnection between Tanzania, Zambia and Kenya
- SAPP membership- Tanzania is a member while Kenya has applied for membership
- Least cost option and effects of droughts on hydro power generation

The presenter also looked at key energy resources that include: biomass, hydro power, geothermal, natural gas, coal, crude oil, solar power, wind power and tidal and wave power.

Mr. Maingu considered the power supply and demand in the three East African countries and came up with the following:

- Kenya's generation installed capacity is 1147 MW (hydro contributes 63.3%, geothermal 5% and thermal 31%). Losses account for 21% and unsuppressed demand is 816.7 MW
- Tanzania's installed capacity is 735 MW, with hydro contributing 501 MW and thermal 176 MW. The load demand is 490 MW with loses of 25% against a target of 12.3%
- Uganda has a generation-installed capacity of 280 MW (260MW from hydro and 20 MW from mini-hydro). There is no suppressed demand but losses account for 33%.

There is need to optimize resources by reducing losses (both transmission and distribution) in grid connections.

On transmission and distribution Maingu had the following suggestions:

- Transmission- critically looks at connectivity, power transfer capability, thermal limits, reactive power compensation, congestion access, way leave rights and compensation.
- Distribution- key areas of concern are primary and secondary distribution, connectivity, reactive power compensation and access.
- Transmission capability and network topologies should address issues of losses, while on service quality- reliability, voltage limits, reactive power compensation and harmonics are the key issues to be addressed.

Other areas that he looked at as part of transmission and distribution include:

- Protection in terms of reserve generation, CT settings & short circuit levels, earthing, lightning protection, generation reactive capability and effect of contingencies
- Grid interconnections as per the existing ones and the potential. (Potential interconnections can be divided into 2: Radial – 33Kv, 60 Kv lines and 132 Kv, and Ring- 220 Kv and 330 Kv lines)

The presenter gave a few examples of power sector reforms in the region. The World Bank and Multilateral Agencies have facilitated these reforms and some of the examples are:

- Kenya and Uganda have a legal framework in place while Tanzania has an existing energy policy.
- Regulatory framework exists in Kenya and Uganda only; the same applies to restructuring and unbundling in terms of competition and privatization.
- Tanzania is the only country that has completed a feasibility study on power trading.
- EAC is looking at the long-term contract as a market operator in regional power pool arrangement. It is also considered as a spot market.
- Market constraints in terms of generation PPA, transmission and financial implications have also been considered as part of the reforms.

The presenter also alluded to several environmental concerns notably pollution and deforestation but the key areas considered include:

- Coal- air pollution due to ash and emission of methane
- Gas – air pollution due to leakages and methane gas
- Hydro power- main concern is watershed destruction, siltation and reduced stream flow
- Solar energy- too many solar panels tend to destroy the scenery (aesthetics)
- Transmission lines often leads to clearing of bushes, cutting of trees and destruction of the natural scenery. It also warrants land acquisition and displacement of people.

Mr. Maingu concluded his presentation by making the following recommendations:

- There is need for more grid interconnections and cross-border sharing of electricity
- Construction of pipelines for transportation of fuels: - oil and gas
- Use of efficient energy technologies
- Increase cooperation in capacity building and joint financing of energy projects
- Investments in thermal generation using gas to avert the effects of droughts on hydro generation
- Use of subsidies to speed up rural electrification
- There is need to target energy use in agriculture, fertilizer production, food preservation, agro-based small scale industries, water pumping for irrigation – all in name of poverty alleviation

CDM and Energy Demand
Mr. Harry L. Kaane

Mr. Harry L. Kaane's presentation covered a number of areas: energy demand to energy resources, energy supply driven by energy demand, CDM of the Kyoto protocol to the UNFCCC, CDM in the energy sector, barriers to participation in CDM projects, strategies for barrier removal, lack of awareness and involvement of key stakeholders, barriers which increase the cost of doing CDM business in Kenya.

He began by saying that the East African nations, like all other developing countries, are striving to improve the standard of living of their citizens. They, therefore, have or are developing plans for achieving high economic growth and wealth creation. He pointed out that there are a number of challenges facing East African governments as they seek socio-economic development. Toping the list is the requirement that development has to be sustainable.

He went on to bring out the importance of energy in any activity geared towards development, noting that economic development will generally involve exploitation of natural resources including land, forests, waters, minerals, value addition to natural produce as essential economic activities. He emphasized the vast amounts of energy required in all these activities.

He also gave the flipside of the equation saying that economic processes necessary for economic development have also a negative impact on mankind. The most important being effects resulting from climate change and degradation of the natural environment.

Mr. Kaane then focused on what he ingeniously referred to as the ' trilemma' governments are faced with: achieving high **Economic** growth, provision of low cost **Energy** and conserving the **Environment**. He observed that the answer to the trilemma lies in appropriate choice of technologies for exploiting natural resources and adding value.

The presenter said that the process of achieving energy, environment and economic objectives leads to conflicting policies and strategies and that governments must therefore adopt integrated management and development of Energy, Environment and the Economy sectors.

Under the energy demand and energy sources sub sector, Mr. Kaane explained to participants that the exploitation of energy resources is driven by energy demand for the comfort of mankind and provision of goods and services. He said that the flow of energy from primary resources to consumers in one direction is pulled by the flow of demand from consumers in the opposite direction therefore completing a cycle – the energy supply chain. He noted that energy is a product just like any other industrial product and its supply obeys similar production and market rules just like other products. He also said that the energy supply chain is interlocked with the energy innovation chain, which comprises the cycle from ideas on energy products and processes to Research & Technology development and to the appearance of new energy products and processes on the energy markets.

Moving the discussion to the Clean Development Mechanism (CDM), Mr. Kaane gave a brief overview giving the reasons it was put in place. He mentioned that it was mainly to:

- Assist non-annex I (developing) countries achieve sustainable development and contribute to the objectives of the UNFCCC; and
- Assist Annex I (developed and transition economies) countries achieve compliance with their quantified emission limitation and reduction commitments.

He pointed out that developing countries hosting CDM projects would benefit from:

- Direct foreign investments; and
- Technology transfer.

Coming out clearly was the fact that foreign investment, by public and private sector, will generally be the driving force behind projects under CDM.

He asked participants to refer to the detailed paper for a listing of green house gases and other relevant information. He gave a list of sectors/source categories of energy among them; fuel

combustion, energy industries, manufacturing, construction and transport industries, fugitive emissions from fuels, solid fuels, oil and natural gas. Under industrial processes, he listed, mineral products, chemical industry, and metal production, production of halocarbons and sf, consumption of halocarbons sf. solvent and other product use comprised of agriculture, enteric fermentation, manure management, rice cultivation, agricultural soils, prescribed burning of savannas, field burning of agricultural residues. Under waste he listed; solid waste disposal, waste water handling, waste incineration.

Mr. Kaane then highlighted the interventions, which provide the basis for developing CDM projects. He mentioned energy resources, energy consumption, structural adjustments, energy efficiency, conversion, transfer and storage, cleaner production, sustainable consumption, energy recovery / recycling, co-generation, by-products and waste

An interesting part of his presentation was on the barriers to participation in CDM projects. Mr. Kaane categorised barriers to transfer of technology and Direct Foreign Investment into the following four groups:

- Lack of awareness, information and poor participation by private sector in climate change activities;
- Lack of capacity to formulate and implement CDM projects;
- High cost of doing business in Kenya; and
- Lack of enabling environment for potential investors in CDM projects

He also brought out the fact that the cost of realizing emission-reduction was found to be a key factor in attracting CDM projects and that some of the barriers impact directly on the cost of implementing CDM projects while others increase this cost indirectly. He also pointed out the barriers that do not influence the cost of emission-reduction but tend to scare off investors thus contributing to a disabling environment.

Identification and prioritisation of capacity building needs was influenced by the adopted goal of developing a long-term strategy and national programme that would maximise the potential benefits of CDM to the Kenyan industrial sector, including power generation and mining.

Of equal importance is the lack of awareness and involvement of key stakeholders. Mr. Kaane identified the following barriers under this group:

i. Lack of awareness on the potential benefits of CDM to industry**;**
ii. The failure of the Kenyan Government to promptly ratify the Kyoto Protocol;
iii. Lack of, or little, data on potential investment opportunities in the country;
iv. Lack of inventories on emissions, necessary to determine and set baselines;
v. Lack of a specific agency or clearing house to co-ordinate data collection, storage and dissemination;
vi. The convention and its protocols have not been fully integrated into national laws;
vii. Inability to effectively participate in UNFCCC meetings at national, regional and international levels; and
viii. Lack of policies and measures that recognise and reward users of clean production technologies e.g. through presidential awards

The following capacity barriers were identified under lack of capacity to formulate and implement industrial CDM projects:

i. Lack of capacity to gather and disseminate climate change related information, formulate and enforce laws and identify opportunities to industry and the public at large;
ii. Lack of capacity for effective participation and representation of the Kenyan industrial sector in UNFCCC meetings;
iii. Lack of capacity to develop and/or acquire and use computer tools for financial, economical and environmental analysis of CDM potential projects so as to identify, design and formulate bankable CDM projects;
iv. Lack of capacity to acquire equipment and instruments and ability to measure, monitor, document, evaluate and certify CDM projects;
v. Lack of capacity to develop and set baselines;
vi. Lack of capacity to identify, negotiate, acquire, absorb and widely use clean production technology;
vii. Lack of capacity to negotiate off-shore financing of potential CDM projects and Direct Foreign Investment;
viii. Lack of capacity to build consensus, ratify UNFCCC protocols and deliver national communications to the Secretariat; and
ix. Lack of capacity to map and document the availability and distribution of natural resources for clean production of electric power.

The presenter also dwelt on the barriers, which increase the cost of doing CDM business in Kenya. Of significance is the high cost of production, occasioned by poor infrastructure. This is a major barrier to investment in CDM projects. This group of barriers was identified as a major obstacle to current investors and responsible for poor performance of the industry. It was observed that investment in CDM projects may not be possible unless the current poor performance of industry is addressed, since new investments are not likely to take place in a declining industrial sector. Specifically, the following infrastructures were singled as potential barriers to CDM projects.

i. High interest rates and bank transaction costs;
ii. High cost and unreliable supply of electricity;
iii. Poor road and rail networks;
iv. Poor and expensive communication network;
v. Unreliable and inadequate intranet and internet services;
vi. Expensive specialised skilled manpower to operate and maintain state-of-the-art technologies;
vii. Unreliable supply of water in most municipalities;
viii. Disabling taxation regime on raw materials and imports, high VAT and cascaded taxation;
ix. Bureaucratic licensing procedures;
x. Bureaucratic clearance of imports;
xi. Weak or lack of innovation-support systems and structures; and
xii. Weak and ineffective industry support institutions.

The following issues were identified as barriers to the creation of an enabling business environment and as factor, which may discourage potential investors in CDM projects
i. Wide spread insecurity;
ii. Long delays in judicial processes;
iii. Poor governance and rampant corruption;
iv. Poor relations with World Bank, International Monetary Fund and some development partners;
v. Economic instability; and

vi. Political instability and interference.

For every problem identified it is gratifying to find a solution of some sort. Mr. Kaane not only discussed barriers but strategies for barrier removal. He presented strategies and measures, identified during consultations with stakeholders that could, if implemented, go a long way to remove barriers, build capacity and enable industrial projects under CDM.

Among the strategies given were:

- Learn-by-doing approach
- Target the root cause and not the symptoms
- Make capacity building and barrier removal demand-driven
- Improve public-private sector dialogue
- Lobbying for policy changes

In order to give specific direction and ensure success in these processes, Mr. Kaane identified barrier strategies that would help to create an enabling environment. These are:

- Institutional harmonization and rationalization
- Information dissemination and involvement of all stakeholders
- Capacity building strategies
- Formulation and implementation of enabling policies, legal and regulatory instruments
- Formulation and implementation of enabling policies, legal and regulatory instruments
- Technology transfer

The presenter gave examples of CDM projects. He said that potential CDM projects have been classified into two groups as follows:

I Energy efficiency projects aimed at reducing greenhouse gas emission by changing the source of energy, improving efficiency or changing energy conversion technology.

II Cleaner Production projects aimed at reducing greenhouse gas emission by changing the production process.

He pointed out that the following three projects from the first group had been analyzed:

1. Replacement of standard distribution transformers with low-loss transformers in industry and the Kenya Power and Lighting Company system. This will require construction of a manufacturing plant for low-loss transformers;
2. Replacement of standard motor (EU class EFF2 and EFF3) with high efficiency motors (EU class EFF1) in industry. This requires technology transfer in form of a plant for manufacturing high efficiency motors;
3. Improving boiler and kiln efficiency:
   (i) Replace old and inefficient boilers and kilns with high efficiency boilers and kilns industry;
   (ii) Upgrade boiler/kiln feedstock from high greenhouse gas emitting fuel to a low emission feedstock (from wood to oil to gas to electricity);
   (iii) Develop and install boiler/kiln energy management systems including regular tun-up of burners.
   (iv) Technology transfer for the manufacture of burners and associated equipment will be needed.

   A plant for the manufacture of burners, burner tuning and monitoring equipment and assembly of boilers will be constructed as a CDM project.

Mr. Kaane in concluding said that reducing GHG is good for East Africa irrespective of who emits and who will reduce the gas concentration. He called upon the countries to therefore support the UNFCCC

objectives fully saying that the CDM is a good tool that can help East African countries acquire technology and attract DFIs. He urged countries to put in place an enabling business environment that will give East Africa an advantage over competitors for CDM projects. In this regard, the following are important:

- Build capacity;
- Reduce cost of doing business; and
- Bundle projects (encourage regional approach to CDM).

Questions and discussion

The presentation on the WSSD, politics of energy and policy implications set the stage for the morning's plenary. It was agreed that WSSD is non-binding legally and is taken up voluntarily. Also emerging from the presentations was the fact the way forward on the renewables was a coalition of the willing. Three areas in which this work is articulated are financial, technology and military. A call for the region to be proactive was made.

The wrong consumption structure of energy in the region was pointed out, reasoning that the countries consume more energy in the households than in industry thus distorting the whole development agenda. Efforts to move into negotiations, as a block must be stressed and the proper role of energy in the lives of people redefined. Wind as a source of energy should continue to be exploited learning lessons from North America. Isiolo was touted as being having the best potential for energy from wind.

Time constraints curtailed plenary discussions. Issues summarized by Hubert Meena (TZ) and Peter Orawo (KE) are captured as part of the recommendations. Also contained in the recommendations are strategic points discussants of each session gave.

Closing remarks
P. Mbuthi

Mr. Mbuthi described the workshop as having been very fruitful. It had provided a ground for lively discussions and enabled the examination of critical aspects of energy, energy use in the environment and looked at funding mechanisms. Regional and national perspectives were discussed and conclusive recommendations have been made.

Mr. Mbuthi emphasized the role of research in the search for energy and said that it was an extremely important tool to use. It would provide data and information to use in tackling our concerns.

He encouraged Climate Network Africa to continue leading the lobbying to governments so that key issues and concerns are incorporated into policy. He affirmed that governments will be ready to receive recommendations from this workshop which will give all three countries a definite direction to move in as we work towards generating clean, affordable and readily available energy for all our people. In conclusion he thanked participants from Uganda and Tanzania for coming all the way to discuss these important issues and wished them a safe journey back home. Mr. Mbuthi closed the workshop at 12.09 pm.

RECOMMENDATIONS

The Minister for Energy in his speech asked participants to make actionable recommendations from the workshop. A number of recommendations were made during every plenary session and at the end of the workshop, a group comprising of discussants and authors of the papers was set up to delve further into the issues raised and make sound recommendations. Their report is awaited. Below are some of the points that came up which the team could use to build the recommendations;

1. Build research to enrich development
2. Build stronger communication channels and strengthen linkages in county and across the region and the continent
3. Move the government, NGO, CSO partnerships to more meaningful levels in the quest for wealth generation
4. A call for all African governments to work together in NEPAD for the good of the African people and create wealth for the continent.
5. Governments need to address the issue of putting in place a policy on charcoal
6. Develop a gas project and contain gas flaring in the region and connect all points with gas.
7. Examine the issue of producing fertilizers from LNG
8. Greater efforts to be put in the exploration of hydrocarbons, solar and geothermal reserves in the region
9. An emphasis on needed investments into the energy sector
10. Governments to put in a range of mechanisms that will favour access to energy by rural communities
11. Efforts to be made to convert biomass into electricity, and at the same time ensure that biomass is used in a sustainable manner
12. Move the biomass market from informal to formal by developing appropriate guidelines and also raise awareness
13. Governments to diversify the options for energy and give local communities alternatives
14. Government to implement policies that embrace the use of electricity which is more efficient
15. Encourage the private sector to invest in energy development
16. Exert greater law enforcement mechanisms and also widen participation in the energy debate
17. Put in mechanisms to adopt market based investments
18. Set up globalization plan as a continent
19. Government to give incentives for buying new vehicles, locally assembled vehicles
20. Develop promotional activities
21. Harmonize the population and energy policies
22. Develop an aggressive policy for tree planting
23. Develop incentives for encouraging the private sector to be involved in energy provision
24. Develop framework for involvement in the EAC energy section
25. Build policy on a rock of research
26. Develop an East African Energy Master Plan
27. Build institutional and technical capacities
28. Harmonize policies to attract Foreign Direct Investment (FDI)
29. Call for governments to support the private sector. CNA was asked to develop strategies to promote this recommendation
30. Government to develop mechanisms to retain those trained
31. Lobby and influence policy at different levels

32. Send these recommendations and policy issues to ministers concerned with energy and environment in the region
33. Develop a strategy for oil replacement and
34. Encourage policy makers to participate in such forums and be available to contribute to debate and answer questions of a policy nature that may arise.

CHALLENGES/CONSTRAINTS

Time Constraints

Time allocated for presenting the papers was inadequate, ranging from 15-20 minutes, which meant hurried presentations.

Stakeholder Participation

The presence of an economist would have enriched the discussions. The policy makers left the workshop after session one, yet issues arose that they could have clarified.

The use of *outdated data* was evident besides the use of information from websites.

LEAD RAPPORTEUR'S STATEMENT

We have documented the deliberations of the workshop. The presenters have done an excellent job and we have almost all the papers. We have especially documented the plenary sessions, which had powerful and excellent interventions.

From the 20 papers we have listened to and discussed, we realize that the underlying problem we are trying to solve is poverty alleviation and creation of wealth, using energy as a tool to achieve these, yet conserving the environment.

Emerging from deliberations, we then must address a number of issues urgently; these are: -

- Develop and strengthen our energy policies
- Forge stronger partnerships with the government, civil society, private sector and communities
- Move forward as a region and as a continent in the context of the new initiatives such as NEPAD, CDM, WSSD and other innovative frameworks.
- Come up with practical solutions for the energy problems that we face
- Move fast to give access to clean energy to the rural communities
- Disseminate policies and research findings to communities
- Renew efforts in research and enhance abilities in data collection.
- Capacity building at all levels.

East Africans need to begin to seriously think about taking their destinies into their own hands. We should determine our development priorities. We should be strategic when we participate in international or regional negotiations. Focus on what is in it for us.

Ladies and gentlemen, the West developed, not because of any specialized skills or any special knowledge but because of moving debates to implementation and secondly by following what the contents of the policy paper says- rules and regulations. We must do this!
Thanks!

ANNEXES

WORKSHOP PROGRAMME

Saturday 22 /11 Nov Time	Activitiy	Speaker/Facilitator
8.30 am	Arrival and Registration, *Tea/Coffee*	Climate Network Africa (CNA)
  09.00 am 09.05 am 09.20 am 09.30 am 09.40 am 10.00 am	**Session 1**: **Opening** **Chair/Introductory Remarks/ Welcome** **Official Opening** Address from UNEP Address from UNDP **Keynote Address** Questions/ Answers	 *Ms. G. Akumu, Exec. Director, CNA* *Hon. Ochillo Ayacko,* *Minister for Energy/Kenya* *Bakary Kante, Director, DPDL* *UNDP Representative* *Dr Shem Ochuodho, Managing Director, Kenya Pipeline COmpany*
10.30-10.45am	**Tea Break**	
   10.45 am 11.00 am 11.15 am 11.30 am 11.45 am	**Session 2: Chair- Mrs. Mary M'Mukindia** **Overview of the Energy Demand in E. Africa** ▪ Commercial Energy Demand/Supply and Gaps in East Africa ▪ Domestic Energy Demand/Supply and Gaps in East Africa ▪ Energy use/supply and international conventions- CBD, CCD, UNFCCC etc. ▪ ***Discussant: Prof. Alfred Otieno (UoN)*** Plenary Discussion	 *Mr. Hubert Meena, TZ* *Dr. P Mwesigye, UG* *Dr. Evans Kituyi, KE*
12.30-1.30 pm	**LUNCH**	
   1.30 pm 1.45 pm 2.00 pm 2.15 pm 2.30 pm	**Session 3: Chair: Dr Fred Nyang** **Implications of Energy Use and Environment** ▪ Energy use in the Transport sector ▪ Energy use in the Industry sector ▪ Energy use in the Household sector ***Discussant: Unep, UNDP & Ms.Angellina Madete (TZ)*** Plenary Discussion	 Mr. Theophill Bwakea, TZ Mr. Peter Orawo, KE *Dr. Tom Otiti, UG*
3. 00 pm	**Tea Break**	
   3.15 pm 3.30 pm 3.45 pm 4.00 pm 4.15 pm 4.30 pm	**Session 4: Chair – Grace Akumu** **Implications of Energy Use (Continued)** ▪ Energy use and Poverty ▪ Energy use and Gender ▪ Energy use and Desertification ▪ Energy use and the rural communities ***Discussant: Eng. Adam Sebbit, UG*** Plenary Discussion	 *Dr. H. Bwisa, KE* *Dr. Beatrice Khamati- Njenga,KE* *Ms. Isabella Masinde, KE* *Mr. Daniel Theuri, KE*

Day 2

Sunday 23 Nov Time	Activity	Speaker/Facilitator
8.30 am	**Arrival and Registration,** *Tea/coffee*	

	Session 1: Chair – Mr. Richard Muyungi (TZ)	
9.00 am	**Recap of Previous Day's Deliberations**	**Dr. H. Kaane, KE**
	Regional and National Policies and Plans to meet Energy Demand	
9.15 am	▪ WSSD, Politics of Energy and Policy Implications	
	▪ Energy Supply and NEPAD	*Ms. Njeri Wamukonya, UNEP*
9.30 am	▪ Energy and MDG	*Mr. Kenneth Aduda, KE*
9.45 am	▪ Energy Supply and COMESA	*P. Mbuthi, KE*
10.00 am	▪ Energy Supply and the E. A. Community	*Dr. S. B. Kucel, UG*
10 15 am	▪ CDM and Energy Demand	*Mutesigwa Maingu, TZ.*
10.30 am	***Discussant: P. Nyoike, P.S. Min. of Energy, KE***	*H. Kaane, KE*
10.45 am	Plenary Discussions	
11.00-11.15am	Tea/Coffee Break	
11.15-11.45 am	**Recommendations and Way Forward** ***Discussant: H. Kaane***	*Two Process Monitors and Lead Rapporteur*
12.00 noon	Closure	Hon Dr. N. Kulundu Minister for Environment and Natural Resources

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