Report on Renewable Energy Stakeholders' Workshop, Nairobi, Kenya.

African Centre for Technology Studies

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Workshop Theme "Clean Energy Access towards a Sustainable Society in Kenya"

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Table of Contents

List of Figures

1. Workshop Summary

Clean energy accessibility has the potential of reducing the cost of living, doing business in key sectors, improve health, enhance competitiveness and lead to employment creation. African Centre for Technology Studies (ACTS) in collaboration with The Energy Resources Institute of India (TERI) recognized this pragmatic aspect focusing not only towards accessibility but also sustainability without compromising quality and standards for clean cooking and lighting products in Kenya. As a result, the two institutions through support from UK Department for International Development (DFID) organized for this forum which brought together all actors within the improved cookstoves and clean lighting sectors. The different stakeholders proposed eminent ideas all of which depict a reformed sector if adopted and implemented by the concerned actors.

2. Workshop Background

Currently, Kenyans spend approximately US$1 billion on lighting annually; with 70% of the population using kerosene for lighting and on a small scale for cooking. Replacing traditional fuel based lighting with alternatives such as solar portable lanterns has major positive impact on the environment, health and household lighting spending an aspect being undertaken by most players in the renewable energy world.

A variety of improved cookstoves and solar lighting products exist on the market some of which compromise standards leading to user misunderstanding and even developing dislike for ICS and solar lighting devices. There is a pressing need for comprehension of appropriate benchmarks and standards that should be enforced in order to promote adoption of clean and efficient energy devices. Further, there is a quest for operationalization of region specific models seeking to stabilize renewable energy market with the aim of increasing adoption by the local communities.
Lack of such access reduces the potential for achieving major structural changes in Peri-urban and rural economies, required for income-generating activities and poverty alleviation. The high reliance of households in Sub-Saharan Africa and South Asia on wood fuels and charcoal for cooking is a major health hazard. Indoor air pollution from incomplete combustion in inefficient cooking and heating stoves contributes to poor health outcomes among women and girls, including ailments such as cataracts—the leading cause of blindness in developing countries.

3. Introduction

The workshop drew participants from various spheres of energy fraternity including government institutions, academia, micro-finance institutions supporting renewable energy, public benefit organizations, research organizations, fabricators and entrepreneurs improved cookstoves and clean lighting products. The unfolding of the workshop by Dr. Ann Kingiri from African Centre for Technology Studies (ACTS) introduced participants to the Centre's activities mainly focusing on energy accessibility in terms of policy and capacity building among the various actors. Most remarkable was the Policy Innovations Systems for Clean Energy Security (PISCES); a six year project spearheaded by the Centre in Africa and Asia since 2007. It was noted that the Centre has been on a forefront in building capacity, policy advocacy and strategization on matters related to bioenergy and solar energy harnessing. There is established a

solar multi-utility Energy centre at Ikisaya in Endau(Kitui County) which has changed lives of the residents in the semi-arid region of Eastern Kenya. The model was an initiative under a consortium that includes ACTS and other members under the solar transition project. Nevertheless, Dr. Ann pointed out that there are three more themes under which the Centre runs its activities other than energy related stuff.

4. Breakdown of the presentations

I. Introduction to TERI-ACTS Partnership under DFID energy access programme

Dr. Murali from The Energy and Resources Institute (TERI) gave a brief overview of the project. The approach adopted by project team included networking with governmental and intergovernmental agencies, private agencies/NGOs, as well as bilateral and multilateral agencies.

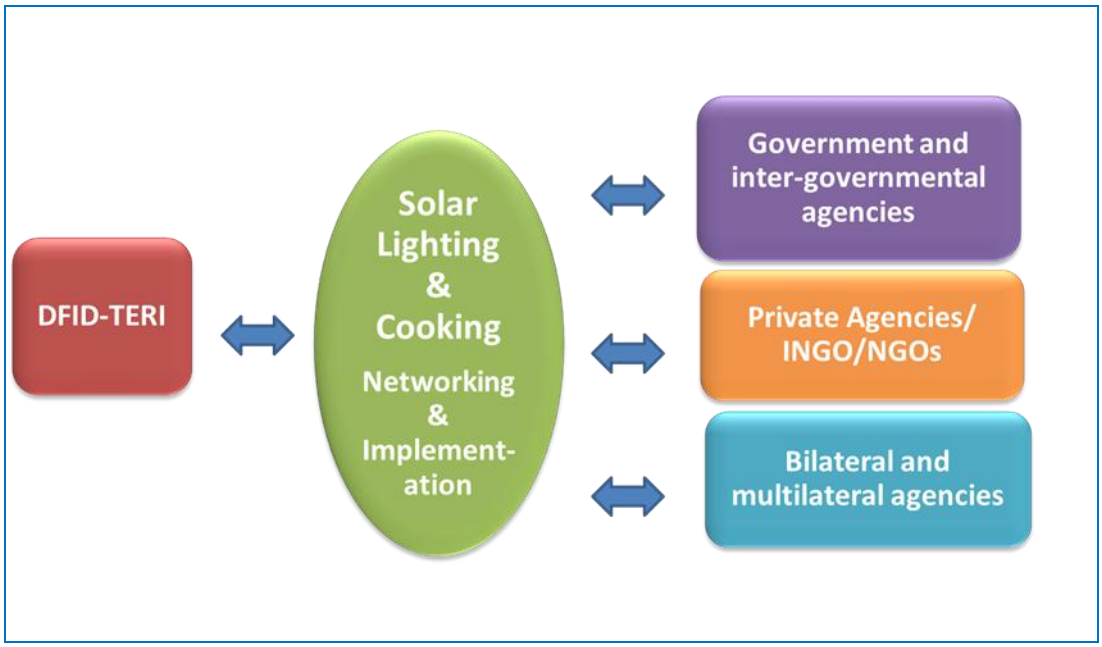

Figure 1:DFID-TERI-ACTS Project Approach

The main output for this approach was to find appropriate technologies and delivery models to scale up the use of clean lighting and cooking for poor households in Africa. The implementation model incorporated; coordination, training, monitoring, documentation networking and policy advocacy. A research and development (R&D) partner was identified for testing and customization. A local lamp assembler as well as cookstove fabricator have been established. Furthermore several marketing and dissemination partners have been identified to promote Plans are underway to establish energy shops or a micro franchisee who will be responsible for after sale services.

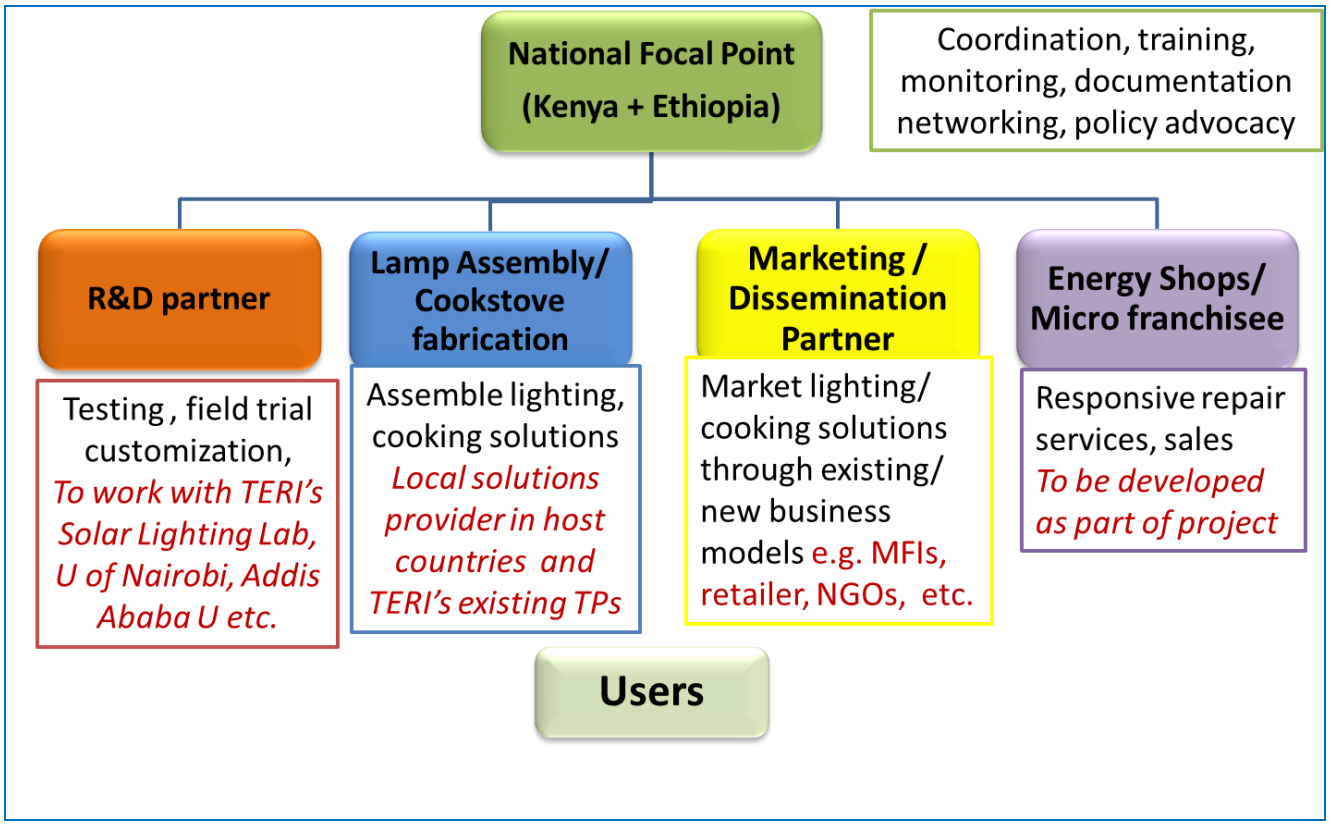

Figure 2:Implementation Model

So far, the following has been accomplished under the project; stakeholder mapping and engagement, capacity gap analysis of identified stakeholders, compiled existing course modules on technical and managerial aspects of solar lighting dissemination, created an inventory of available solar lamps in Africa, compiled market models of solar lamps, identified trial areas for field testing and pre-deployment survey, selected appropriate solar lamp models for field testing and deployed solar lamps in Kenya.

As for the cook stoves, TERI-ACTS partnership has been able to conduct stakeholder mapping and engagement, identified trial areas for field testing and pre-deployment survey, setup local fabrication of cook stoves and hosted technology discussion forum (testing & standards) on cook stoves and lighting solutions. Plans are underway to engage in consultations with microfinance and carbon finance institutions.

Nevertheless, there exist challenges in the dissemination such as high cost of battery, electrical and electronic components, lack of availability of Li-ion battery and other components, irregular supply, lack of skilled personnel and testing centres, very few dealers in the market who prefer imported products over local fabrication among others.

II. Mainstreaming Gender in Energy Projects

Dr. Anna Kingiri (ACTS) emphasised on the need to ensure gender mainstreaming in all energy related projects .During this, she delivered a presentation that moved majority of participants as much of the failures in prior projects implemented representative organizations were thought to have roots from lack of gender consideration.

Gender mainstreaming is a process whereby gender concerns are routinely raised within everyday operations of an institution or organisation and resolved in a gender-just manner. The process involves four steps: Planning, designing, implementation and monitoring and reporting. Gender roles and relations in their context in society affect people's access to and control over resources and participation in decision making. As such, both men and women are equal stakeholders in benefiting from energy use.

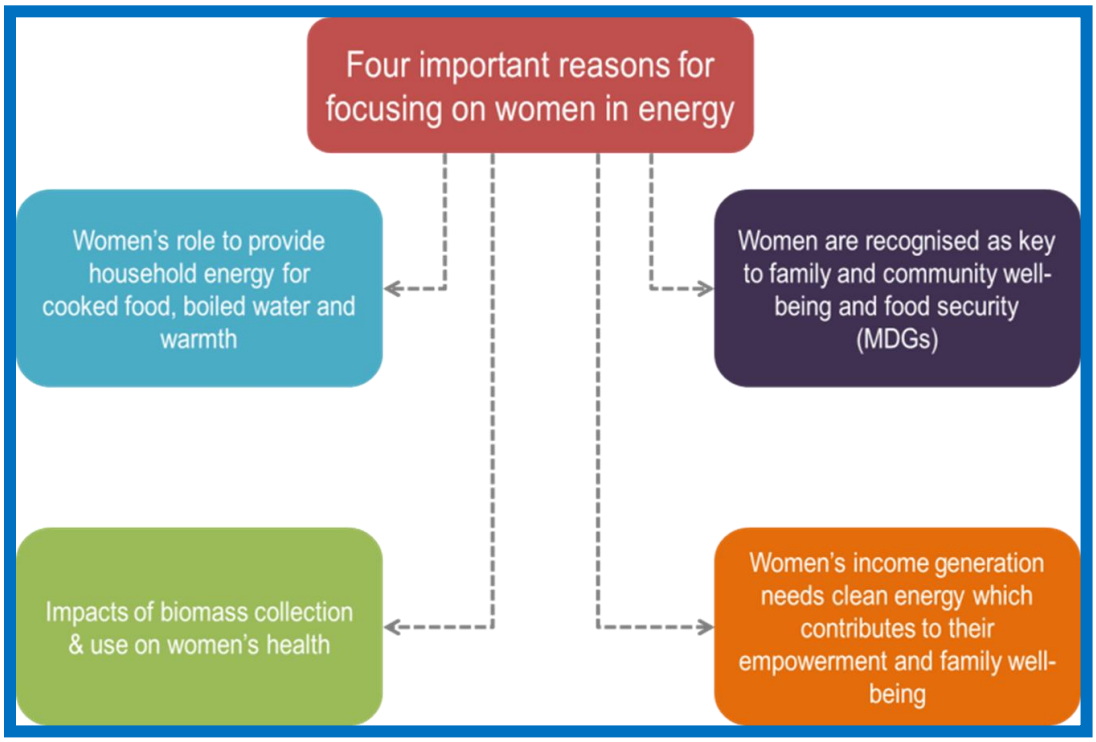

Figure 3:Gender & Energy Discourse

Often, men and women do not benefit equally from access to clean energy. It is therefore important to carry out gender analysis which aims at assessing the way in which labour is distributed within energy projects. It's all about reaching a better understanding of how communities work from the perspectives of relationships between men and women rather than being biased to women or men alone. Further, as much as gender mainstreaming is important, it faces challenges such as:

- Lack of skills and personnel to carry out gender analysis,
- Gender integration comes as an afterthought
- Few gender specialists

One Case study was mentioned under ACTS's Policy Innovations Systems for Clean Energy Security (PISCES), energy research programme that aims to contribute to innovation and policy

relevant knowledge in the energy sector. Under this programme; 242,440 people have benefited through improved cook stoves of which 131,462 (54%) are women. This shows a quantitative evidence of the importance of gender analysis in mainstreaming gender in projects. Qualitative evidence shows: Indoor pollution levels reduction, reduction of cooking hours and reduction of fuel wood use. This has promoted significant impact on health and time saving for other chores.

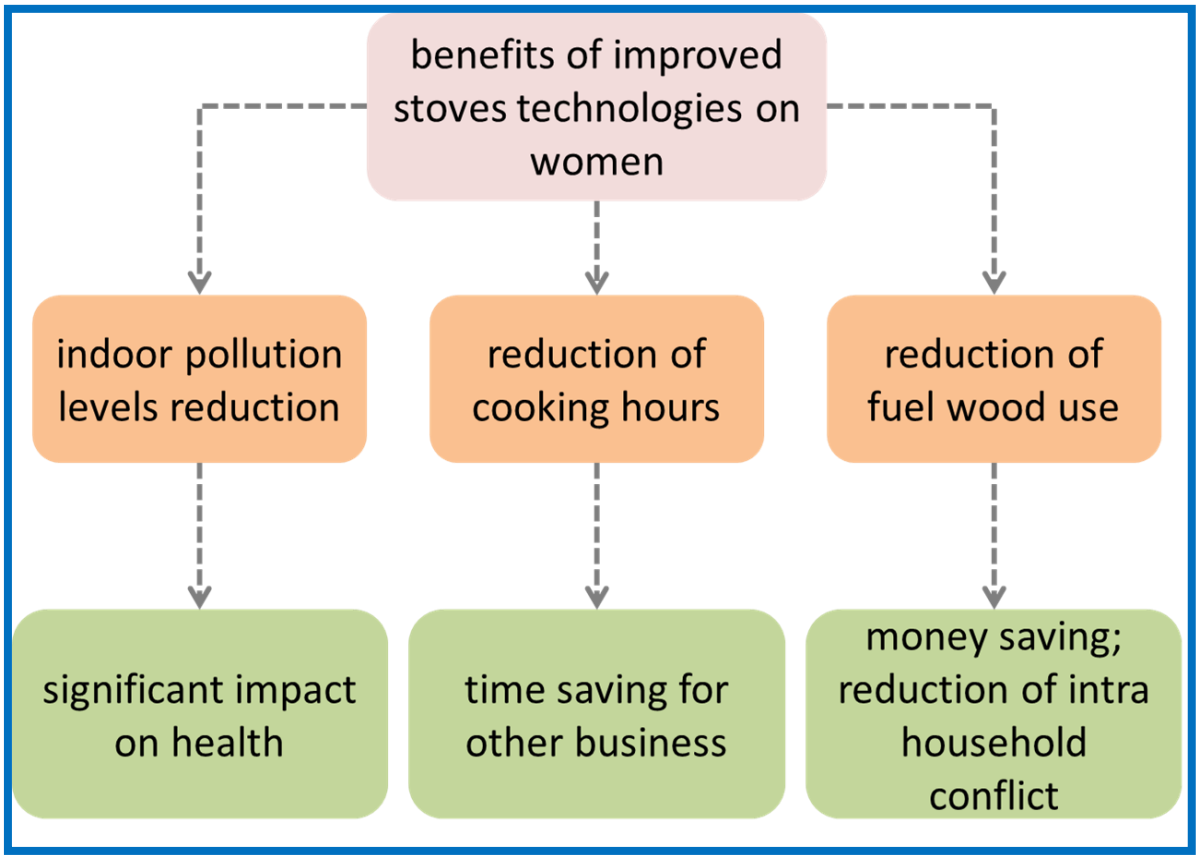

Figure 4:Improved Cookstoves and Gender mainstreaming; Qualitative evidence _PISCES

There is a need to develop new approaches towards gender and innovation that is are inclusive; for instance, a shift from women's empowerment systems to innovation system concept because the latter provides new opportunities for taking note of gender concerns in innovation planning. In conclusion, Dr. Kingiri mentioned that the female gender should be involved in entire fabrication process in endeavour to have them being part of systems innovations.

III. Success factors for a private sector oriented business model for region specific dissemination of clean energy products as promoted by GIZ EnDEV

This presentation was delivered by Reimund Hoffmann from The Deutsche Gessellschaft fur Internationale Zusammenarbeit (GIZ) an organisation that acts as an agency for the implementation of the Energizing Development Programme (EnDEV). EnDev is an organisation that supports people to get access to energy services in Africa, Asia and Latin America and is an impact oriented initiative between the Netherlands, Germany, Norway, Australia, the United Kingdom and Switzerland.

During this presentation, it was noted that Kenya's rural population makes up 78% of the total population estimated to be about 6 million households. Currently, national wood consumption is

about 40 million m^3 per year with 80% consumed as fuel wood and mostly burned on inefficient cooking technologies. According to statistics by UNDP (2009), wood fuel accounts for 88.2% of fuel used for cooking in rural areas as compared to 10.3% in urban areas. This shows that there is need to provide efficient ways for energy provision and accessibility in rural areas endeavouring to reduce costs as well as carbon emissions that contribute to climate change.

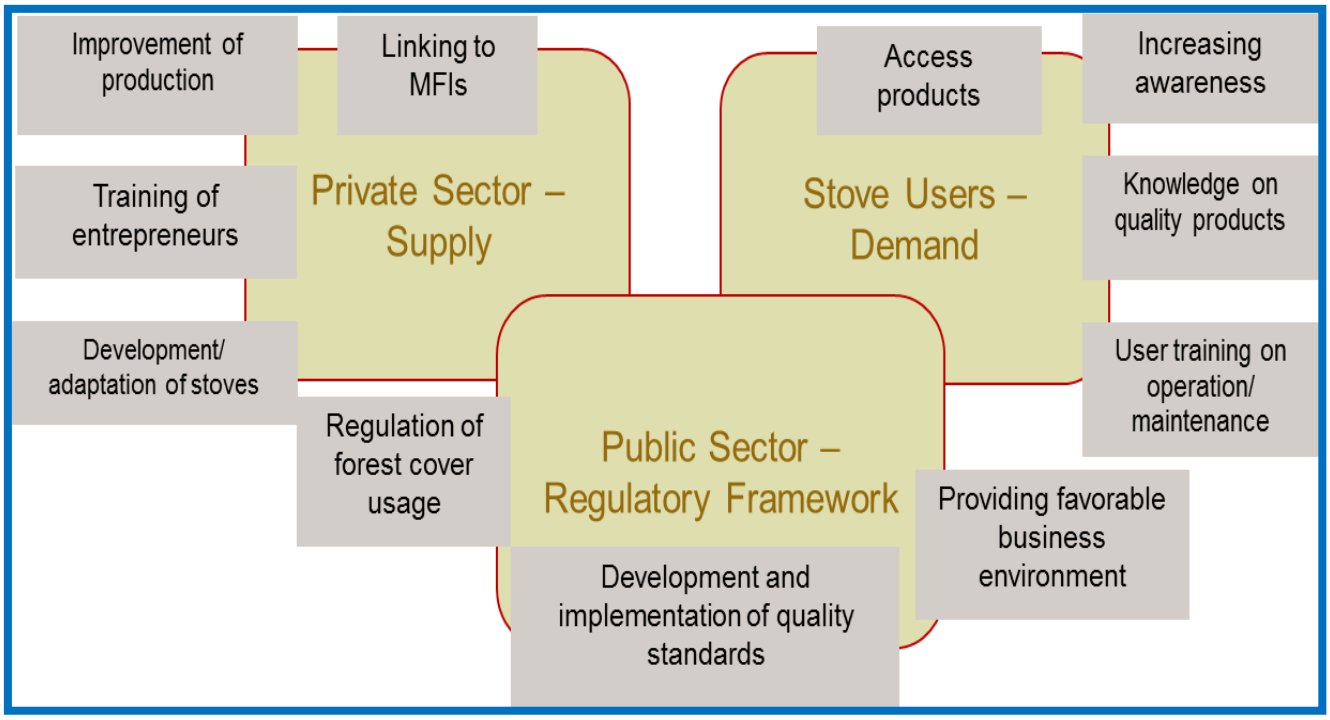

Figure 5:EnDev Kenya – Approach for Improved Cookstoves

GIZ follows a strict commercial approach whereby EnDev supports the private sector to undertake commercial activities within the value chain of improved cookstoves. It enhances demand through raising awareness among the customer base while lobbying the enablers to provide favourable framework conditions such as favourable business environment, development and implementation of quality standards.

Two types are promoted under the GIZ model

- Jiko kisasa stoves
- Rocket stoves

The rocket stove accounts for 50% fuel saving. The respective technicians for this stove are very mobile and cover a wide territory , easily accessible and are trained at the lowest administrative level. This has contributed to increase in the number of stove builders consequently increasing the number of stoves in the market.

The Jiko kisasa stoves account for 40% fuel savings. The production centres for this stove depend on availability of clay which can limit new centres. Business skills for marketing and installation of Jiko Kisasa liner created more distribution channels for the liner without having to train more producers. The development of the stove's value chain with marketers and installers independent of the producers has increased sales. On the downside, the number of Jiko Kisasa producers has not changed much over time due to in availability of clay and transport costs which have limited its wider distribution.

As part of project achievements, , 1.4 million stoves have been disseminated at household level reaching about 7 million people. This project has been able to support the local economy contributing to a total of 50 million Kenya shillings per year. It has been able to save every family that uses an improved stove 1.095 tonnes of firewood per year translating to 84,230 ha of forest cover saved and 1,008,000t of CO_2 emission reduction per year.

Main success factors under the project include:

- Policies favourable to cooking sector whereby the government is now actively encouraging clean energy and laws protecting forests and water catchment areas
- Supply of improved cookstoves where by the private sector is leading in service delivery through network of dealers.
- Demand for improved stoves is on the rise due to enhanced awareness, affordable and acceptable technologies

In conclusion, Reimund stated that lessons could be learnt from this initiative one being the fact that integrated approach to household energy issues is necessary and that both market- based and public support systems are relevant in the commercialisation of improved stoves.

IV. Environmental Issues and Improved Cook Stoves (Project Surya)

Mr. Iyangra from United Nations Environmental Programme (UNEP) presented the an outline of UNEP's endeavour to comabat climate change through better adaptation measures. He introduced Project Surya which aims at reducing regional impacts of global warming by directly and demonstrably reducing atmospheric concentrations of black carbon, methane and ozone. The project targets to replace the highly polluting cook stoves which are traditionally used in rural areas with clean cooking technologies. The major benefits of reducing these air pollutants will include immediate improvement in public health, agricultural productivity and economic development for the rural people in developing nations. One of its major objectives is to enable access to cleaner cooking technologies.

Atmospheric Brown Clouds(ABC) phenomena, which refers to a layer of air pollution containing aerosols such as soot or dust that absorb as well as scatter incoming solar radiation, leading global climatic effects and posing risks to human health and food security dominated the presentation. The first observations of these phenomena were made in 1998-1999 as part of the Indian Ocean Experiment (INDOEX) whereby air pollution measurements were taken from satellites, aircraft, ships, surface stations and balloons. It was then decided that there was need for preliminary assessment which was published in 2002 stating a need for science and capacity to prevent ABC. For over ten years, an ABC science team has incorporated science, observatory and impact assessment in studying ABC and their impact on climate change. ABC's have been said to have a negative impact on:

- food security (e.g reduced rice harvest due to floods and droughts)
- Water security: ABCs cause glacier retreat and can impact on precipitation patterns.
- Human health: WHO estimates 2 million people a year die from indoor air pollution and an additional 1.3 million deaths are caused by urban air pollution.
- Global warming: ABCs' contain methane, ozone, and black carbon which are major contributors of the greenhouse warming effect so far.

ABCs' are directly associated to climate change resulting from human activities such as burning of fuels. It is therefore important to understand climate system in order to provide solutions for reducing the concentration of ABCs. There is a need for linkage between understanding and action thorough awareness, willingness, capacity and technology.

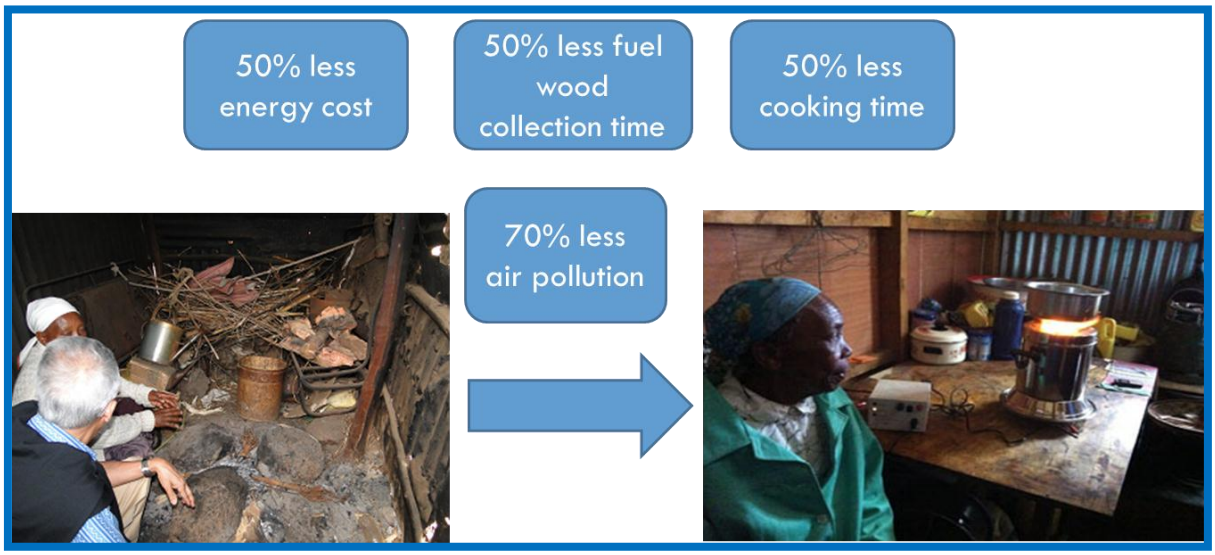

Figure 6:Project Surya: Kenya

Climate change effects are social, economic and the environmental hence there is need for an integrated response in the context of sustainable development that will improve human health, agriculture production, regional climate, water security, living standards and economy. Project Surya has been actively involved in this area.

In December 2010 Project Surya enabled the introduction of improved cooking and lighting system. The results of the improved cookstove and lighting systems was 50% less on energy cost, fuel wood collection time and less cooking time all amounting to 70% less air pollution as illustrated above. Project Surya faces barriers including;

- Promoting awareness on available mitigation measures
- Availability of mitigation technologies
- Affordability of the improved products
- Assessment of the economic, environmental and social benefits of mitigation measures.

V. Business Opportunities in the Cookstove Sector

Maurice Onzere shared out the experience from Global Village Energy Partnership (GVEP) in promoting entrepreneurship within the cookstove sector in collaboration with micro-finance institutions. GVEP is an organization that aims to increase access to modern energy and improve the quality of lives of people in developing countries by supporting and working with local businesses.

Globally, 3 billion people rely on traditional biomass or coal burning cookstoves for cooking. 70% of Kenya's population relies on solid biomass for cooking and heating and as a result 14,000 people die annually from indoor pollution. This creates a need for alternative cooking methods or innovation that decreases pollution and hence reducing any health risks. The road to clean cook stoves started about 30 years ago with the Renewable Energy conference of 1978 setting the stage. This led to the springing up of improved cookstoves such as Kuni Mbili that are produced in artisanal nature. However, up to date, there has been no substantive quality and performance improvement in the cookstove sector.

There are plenty of lessons from which cookstove technology innovators can learn from other technologies that have proven successful for instance mobile phone technology. He suggested that lack of business opportunity resulted to cookstove technology lagging behind. In identifying the missing link that hinders tapping into this huge market opportunity; cookstove producers were urged to consider customers' value for their money against product quality, affordability and performance. Since cookstoves provide business opportunity in the entire supply chain, dealers need to identify a component of the supply chain that best suit them and unlock opportunities from that component.

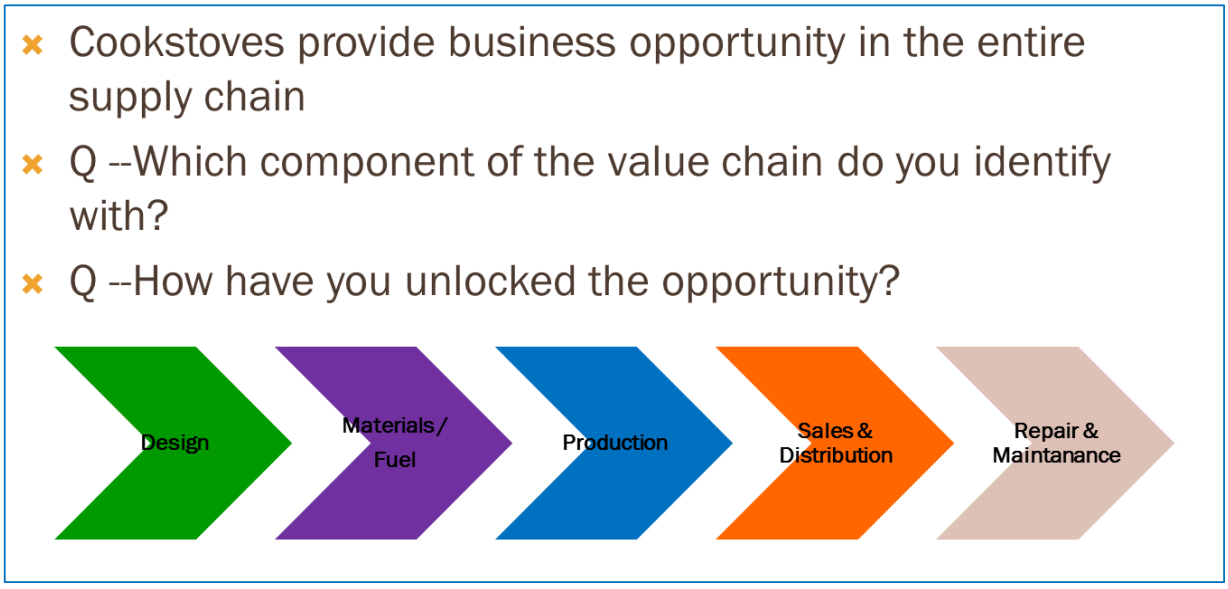

Figure 7:Unlocking business potential in Clean cookstoves & Lighting Sector

There is need to innovate and expand the cookstoves uptake with entrepreneurs taking bringing in the delivery channel innovative ideas. For instance one can use the target market approaches whereby the nature of customer demand patterns determines the type of marketing strategy to be used. Cookstoves present a huge business opportunity for the financial institutions(FI) which is yet to be tapped. This has the potential to benefit over 5000 institutions (schools, hospitals, hotels and restaurants) in Kenya. Instead, financing institutions perceive cookstove loans to be

little and expensive to manage compared to other ventures. This simply points out the lack of innovation in loan packaging and unwillingness to challenge the unknown (not willing to take risks).

In the case of reaching out to institutions like secondary and primary schools that are mostly keen to acquire improved cook stoves, FIs' need to structure loans that fit these institutions as they are losing out on a huge business opportunity. For instance, on average, a school requires an ICS that costs KES 200,000. If it targets about 500 schools, it will have a loan portfolio of about KES 100, 000,000. The renewable market generally requires new product differentiations and systems efficiencies through innovation.

5. Panellist session

The last session engaged participants in an open discussion on three main bottlenecks that affect dissemination of clean lighting and cooking products in Kenya. The main issues discussed and include;

I. Standards and quality conformation for Cooking and Lighting products

Quality and standards are regarded key to consumers' choice for a given cooking or lighting product. It was noted that Kenya Bureau of Standards and Kenya Industrial Research and Development Institute are developing standards to be adopted by all cookstove fabricators and importers as well as lighting products in Kenya. Discussions between the aforementioned and the energy regulatory board are underway on how best these regulations will be enforced. It was also noted that the current regulations do not promote innovation. It was suggested that the following concepts be considered during the final drafting of the regulations:

- Manufacturers' integration
- Sustainability of market through appropriate standards
- Proper regulation
- There should be a willingness to enforce warranties and contracts. This will enable the producers to be more confident about their products and even improve their quality.

II. Addressing Issues of After Sales Services for ICS and Lighting Products

During the open discussion, it was noted that many products flood the market some of which are of a limited lifetime or simply low quality. Thus, it was recommended that measures be put in place to ensure that consumers are guaranteed/warranted for any cooking or lighting product purchased so as to promote users willingness to buy . Further, it emerged significant to ensure local expertise in the distribution channel who can offer technical assistance to end users whenever required in the event of product glitch.

Some points for considerations during this sub-thematic discussion include;

- There is need for the creation of an after sale service centre whereby training and education of customers on ICS and lighting products as well as reception of feedback from customers
- Fabricators should develop manuals to accompany each stove delivered to the market
- Media advertising could play a big role in dissemination of information on ICS and lighting products in order to raise awareness of products as well as their conformation to standards
- Capacity building on quality enhancement should be carried out: ICS and lighting products dealers should be trained on basic entrepreneurial skills.
- An R&D reporting unit should be established that will avail user support services.

III. Breaking barriers to financial accessibility in RET

- A deliberate fund should be created; e.g a capital access fund that engages the financial institutions with the sector.
- Financial institutions should also consider offering zero interest loans to micro businesses in the ICS and lighting products sector.
- Involvement of MFI in RET initiatives and forging up of guarantee initiatives
- It was also suggested that the manufacturing sector should look at the ICS and lighting products from a long term business basis

6. Conclusion

There is a pressing call for all value chain actors in the renewable energy sector to realize the need to keep innovating best approaches towards combating climate change and variability with appropriate region specific technologies. This includes creativity within the improved cook stoves and lighting products that yearly claim innocent lives. As highlighted during the panellist, there are untapped opportunities for the distinctive value chain players ranging from enablers, actors and support service providers that shield the potential to stabilise RET acceptance among local communities. The concept of developing sound policies and regulations to benchmark standards and quality for clean lighting and cooking products requires urgent attention by KEBS, KIRDI and ERC through the engagement of stakeholders for the purposes of eliminating products that compromise internationally agreed standards.

Annex1: List of Participants

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