RE TRENDS EAST AFRICA

Tracking regional renewable energy developments

ASD

Quarter 3, 2015

Opening Thoughts

Welcome to ASD's Q3 2015 Newsletter – where we are focusing on energy access and women.

The new Sustainable Development Goals (SDGs) and Sustainable Energy for All (SE4ALL) initiative commit signatories to achieving universal energy access by 2030. But do we really agree on what "access" is, how to achieve it and whether it's possible to achieve in this time frame? Most importantly, is the funding available to make access happen?

A recent publication by the Overseas Development Institute (ODI) shows that in considering 'energy access,' modern cooking is just as important as lighting. Globally, however, 2.7 billion people lack access to clean and safe household cooking energy while 1.3 billion lack access to electricity. The biggest energy gap is not electricity, it is cooking energy! And this is especially true in Africa.

ODI shows how much money is being spent for on and off-grid electrification -- and we've come far in the last 20 years. However, though it would take much less money to make modern cooking energy universally available by 2030, we seem to be focusing a lot more on electricity. This is a serious gender issue.

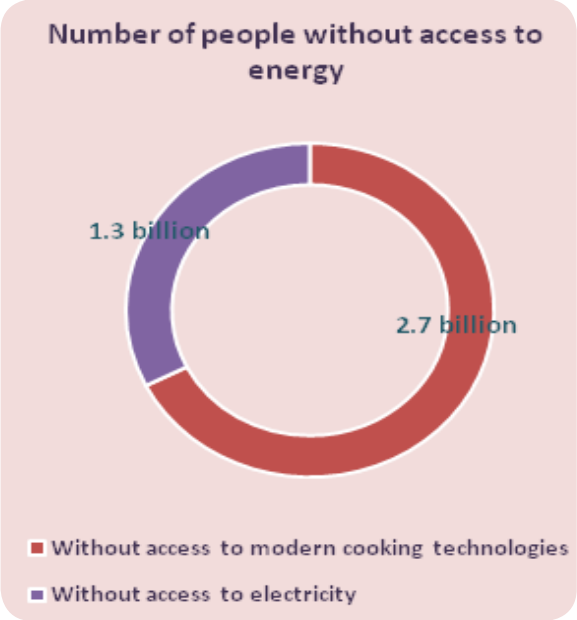
At ASD, we know how important electricity access is for so many things – education, business, communication, health, security, entertainment. But as access to modern cooking fuels and technologies affects women so disproportionately, we take a moment here to focus on these issues, through the eyes of some leading colleagues in this field.

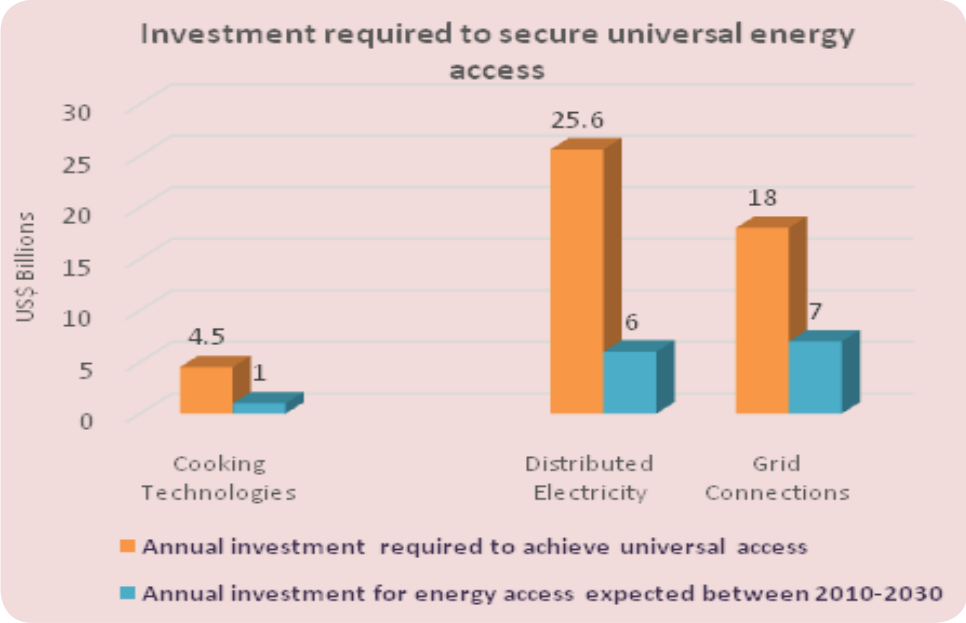
Happy reading!

Mark Hankins, CEO African Solar Designs Ltd.

Launching the new Farasi Lane primary school Baking Club's new oven manufactured by Cookswell Jikos.

Energy Numbers





Source: Universal energy access: can we make it sustainable? By ODI (2015)

Women and Energy Needs in Africa

Richenda Van Leeuwen – Executive Director, Energy Access, United Nations Foundation

UNF's Energy for Women's and Children's Health initiative is looking at how to reduce women's and children's health vulnerability with better and more reliable energy at health clinics. Their focus is on electricity needed for critical services such as vaccine refrigeration, security and task lighting, and more. A strong 'gender' component of the work seeks to ensure that women's voices are built into the solutions.

While implementing this project, have you identified other priority energy needs for women in Africa?

Like everywhere else in the world, women utilize energy for a range of purposes, for example for irrigation and agricultural processing, for communications and ensuring cellphones can be charged, in small businesses that depend on power, and for lighting their homes at night. And women use energy as well for entertainment. While basic access is critical, another priority energy need for women in Africa is access to energy in humanitarian settings. In conflict areas or refugee camps where they are already in a vulnerable situation, lack of energy access can exacerbate incidence of sexual and other kinds of violence against women and girls, as well as increase the risk of fire and burns from kerosene lanterns

What are some of the major challenges the continent faces in addressing these energy needs?

While grid electrification continues to grow across the continent, rural areas with low population density have often been considered too expensive or low priority for the provision of grid electricity. There are some wonderful examples of companies bringing small-scale energy solutions even to very low-income families, utilizing pre-paid or "pay as you go" technologies to allow people who can't afford to purchase a system outright to either purchase over time, or simply pay for the service provided. Many of these organizations are also using women as distribution agents, to provide them economic empowerment, and also ensure that they are also able to benefit from the jobs created through the growth of this sector.

Katherine Lucy – CEO, Solar Sister

As Richenda mentioned, increasing the role and voice of women in the energy value chain is a critical part of improving solutions for women's energy needs. Of Solar Sister's more than 1700 entrepreneurs, the majority are women. Katherine Lucy shares some of the work the organization has been doing in the continent.

What makes Solar Sister a unique venture from other renewable energy social entrepreneurs?

Solar Sister is the only organization that taps into the power of women to deliver energy access direct to the home, opening the door to greater health, safety, education and economic prosperity. We are unique because we:

1) provide geographical access to clean energy by building the last mile supply chain and
2) bring women to the table by empowering them with the technical, business, and leadership skills needed to transition from energy poverty to prosperity.

In addition, all of the products that we sell are certified by Lighting Africa and the World Bank and carry a 1-2 year warrantee depending on the manufacturer. If any customer buys a product from a Solar Sister Entrepreneur and is not satisfied, she can bring it back for an exchange or refund.

What are some of the ways that energy needs can be addressed in Africa?

These needs can be addressed by inviting women into the conversation, listening to their ideas and solutions, and empowering them with the resources they need to be agents of change in their own households and communities.

At Solar Sister, supporting women to become entrepreneurs not only means more income, greater confidence, flexible hours, and greater agency in household decision making – but also increased visibility as community leaders, actively promoting clean energy as a solution to health, education, safety, and economic challenges of their families and communities.

Do you think that by having more women in the energy sector, there will be more investments in technologies that provide energy sources for cooking and heating needs?

There is no lack of clean energy technology available – the investment we need to make is in women to access that technology.

Women and Energy Needs in Africa

Teddy Kinyanjui – Sustainability Director, Cookswell Jikos

Teddy's father, the late Dr. Maxwell Kinyanjui, was a pioneer in the cookstove industry in Kenya. Through Cookswell Jikos, a family owned business that has grown to serve the wider East African market, Teddy furthers the work his father started. Key to their business model is addressing sustainability at all stages of the supply chain – including tree growing, wood harvesting, charcoal production and cooking use.

How does cookstove market in Kenya compare with other countries in East Africa?

In comparison to other East African countries, Kenya is the leader in innovation and manufacturing capacity for improved stoves. Along with having the strongest regional economy, education levels and access to internet. Kenya also has a very large and very talented 'jua kali' sector and is the recent regional home to at least 3 new multi-national cookstove manufacturers.

Tell us about your father Max Kinyanjui and his contributions to the improved stove industry?

My late father Dr. Maxwell Kinyanjui, along with many dedicated and passionate people, was instrumental in starting the improved cookstove program known as the Kenya Ceramic Jiko. This clay lined jiko adapted from the Thai bucket stove has become the most popular type of improved stove design in all of Africa.

But beyond just the cookstove technology, Dr. Kinyanjui was also one of the first cookstove manufacturers to define a critical holistic wood energy system (The seed-to-ash cycle) as part of a long term sustainable solution to cooking using biomass. This involves 3 very easy steps - simply grow your own trees, only use the pruned branches and twigs to make charcoal and use energy efficient cooking devices.

Are women's energy needs being addressed adequately in the continent?

In my opinion, very few people's energy needs are being adequately addressed on the continent. I believe Africa has more than enough energy to even exceed the continent's wildest expectations. I think the technology is here, the market is ready. What lacks is the policy mechanisms and political will to make energy accessible and affordable to every person in Africa.

Myra Mukulu
Clean Cookstoves Association of Kenya

Like Katherine, Myra believes that women are important not only as end users of efficient energy technologies but also as economic agents in the value chain. As an expert in the cookstove industry, she talks with us about market availability and stove adoption.

What does the Clean Cookstoves Association of Kenya do?

CCAK's mission is to facilitate the scaling up of the clean cookstoves and clean fuels markets in Kenya. Our target is to have all institutions and 5 million households using clean fuels and stoves for cooking in Kenya by 2020. Whilst we do not sell or distribute the stoves or fuels ourselves, our members and other sector stakeholders do and we serve as a co-ordination organ to promote an environment for a thriving cook stove sector.

How would you describe the cookstove market in Kenya?

The Kenyan market is vibrant and commercialized with a wide variety of players. Many stove models are available in the market ranging from, 'jua kali' or artisanal kind of stoves which are handmade or constructed inside households and institutions to factory made stoves. There is a whole value chain of producers, installers working with marketers to spread word about the products. Some of the stoves have also made inroads into supermarkets. Financial institutions such as SACCOs and some banks are also offering loans to purchase some of the stoves and the clients find about the stoves this way.

How much are women involved in the manufacture and sale of cookstoves locally (and regionally if aware)?

Women are an integral part of cookstoves business in the East African region because cooking is still considered to be women's role. In a recent study commissioned by the Global Alliance for Clean Cookstoves on stove entrepreneurship in Kenya, it was found that women outsold men stove sellers by nearly 3 to 1, entrepreneurs that were found to be high sellers (selling more than 8 cookstoves), were nearly twice as likely to be female or working in the urban setting and If women sold to other women, those consumers were more likely to report consistent and correct cookstove use and were more likely to report the benefits of cookstoves as compared to male cookstove sellers

Why is it hard to get rural women to switch to improved cookstoves?

A variety of reasons make it difficult for rural women to switch to improved cookstoves. These include but are not limited to: lack of awareness, poor stove user training, wrong stove type, sale of sub-standard products and prohibitive costs.

Women and Energy Needs in Africa

Dr. Mbaari Kinya - Managing Director, Women in Energy and Environmental Technologies (WEET) Enterprises limited

WEET is a young company that provides women with technical training and connections to cookstove manufacturers. Dr. Kinya has spent several years researching cookstoves and the role culture plays in defining appropriate cooking solutions.

ASD engaged PIEA's analyst Kevin Adundo to shed light on how to make LPG a more viable option in the region. What financial or distribution models are needed to scale up the market? He shares some developments in the LPG sector that could trigger growth.

Kevin Adundo – Analyst, Petroleum Institute of East Africa

Are women's energy needs any different to those of men? In what way are they different?
Yes, the difference lies in the role that the society has given us.

There are numerous technologies on clean cookstoves available globally. However, not many women in Africa use clean cookstoves, why is this the case?
Most of the available technologies are not local – they were developed elsewhere and when brought in, face the challenge of fitting into the culture of a traditional African community. A study done in Mali on the use of improved cookstoves revealed that most of the women only used the stove to cook tea. The rest of the meals were prepared on a traditional stove. There is need for development of multi-purpose stoves that can be able to meet such preferences.

Tell us about the research you're doing on ethanol stoves?
Currently, I am concentrating on the liquid ethanol stove by SAFI international. This stove uses 1 litre of ethanol which burns for 5 hours. It retails at Ksh 3300 (USD 33). I have also tested the ethanol gel stove. The cost of its fuel (gel) is relatively more expensive than liquid ethanol and one can only use a small cooking pot on it. For urban areas, I would recommend ethanol stoves while in rural areas, let us have more use of biogas technology.

What do you think most African households will be using as their primary source of energy for cooking in 2050?
Ideally, industrial alcohol stoves. This is one of the cleanest and most renewable technologies in the industry. LPG is also clean but it is not renewable and adds to the level of carbon in the atmosphere.

It may be cheaper to use LPG than charcoal stoves. Let's take my own example. I refill my LPG cylinder with ksh 2700 and use it for 3 months – on average, I spend ksh 30 daily on cooking fuel. But a woman who buys a tin of charcoal daily in one of Nairobi's slums, can pay ksh 50.

Can the LPG industry be financed in a model such as M-KOPA to improve the market and use in East Africa?
Owning LPG cylinders has been one of the major blocks in growth of the industry; the cost of buying a filled cylinder is high for majority of Kenyans and East Africa generally. We can borrow from the Mpesa business model to introduce a concept that will enable customers to purchase and own LPG cylinders, settling the costs through flexible installments.

Are there any plans to scale up operations by current market players in LPG? (Such as NOCK)?
Yes, there have been several activities in relation to scaling up the LPG sector in Kenya. Total Kenya recently invested in enhanced storage capacity to augment supplies to Nairobi and upcountry, it doubled its storage capacity in Nairobi. Kenya Pipeline Company is in plans to build storage LPG tanks in Nairobi to cater for a sharp increase of demand in urban centers. Addax Kenya, National Oil Corporation of Kenya (Nock), Hunkar Trading, Kenol Kobil, and Hass Petroleum will in total spend over Ksh1.7 billion to build new or expand existing LPG plants. African Gas and Oil Company did build a 28,000-tonne LPG storage facility. Nock plans to introduce mobile units that allow partial filling of cylinders.

The nexus of women and energy is multifaceted – and women are playing an increasing role at all points in the value chain. Though everyone's energy needs span electricity and heat energy, women's role in most African households means cooking energy is primarily a woman's domain – which means women suffer from low access and polluting fuels to a greater extent, but also stand to influence and benefit from growing markets for these technologies.

Featured story:
BURN Manufacturing's JIKOKOA™

Written by Wilkista Akinyi

According to the World Health Organization, over 700,000 people die annually as a result of indoor pollution. This is largely contributed by the use of traditional cookstoves, particularly in Sub Saharan Africa. In June 2015, BURN received the Ashden International Award for its work to address clean energy for women and girls in East Africa. BURN manufactures the JIKOKOA, a charcoal cookstove that is gradually gaining preference and market in East Africa. With about 70% of the population in sub-Saharan Africa still heavily reliant on charcoal and wood fuel for cooking, BURN is not only serving the economic need in the region, it is also making impacts on health and the environment. We visited BURN's state-of-the-art factory in Ruiru industrial park near Nairobi.

BURN's history dates back to 2011 when Peter Scott, the company's CEO, having worked in the Sub Saharan Africa cookstove industry for a long time, identified a need. Out of need to streamline the supply chain, BURN decided to set up a manufacturing plant in Kenya. "It is easier to fix technical issues on our products from here – we are also closer to the market and have a better understanding of its need," says Boston Nyer, the company's Chief Product Officer.

The JIKOKOA stove is in its second generation with a third generation set to be out in early 2016. We saw five different product versions of the stove.

The factory produces about 550 stoves per day and supplies to wholesale and retail outlets who include major supermarkets in Kenya such Nakumatt, Uchumi and Tuskys. It also has suppliers in Uganda and Tanzania. Averagely, the stove costs Ksh 3800 (USD 38) at a dealer store. Between August and September 2015, BURN sold 10,000 stoves in each month and aims to make higher sales as it gains market in the region. It continues to receive feedback from several customers on the product's efficiency.

	BURN at a glance.
2011	Year BURN opened factory in Ruiru, Kenya
20 kW	Solar system to be installed at factory by N Vision Energy by end of 2015.
45%	% of charcoal saved by JIKOKOA stove.
50%	% of households in region BURN targets to reach.
64%	% of smoke emission reduced by stove.
100	Minimum number of employees at factory with half being women.
103%	Growth in sales between Feb and Sept 2015.
550	Number of stoves manufactured daily.
KES 3800	Cost of JIKOKOA stove in Kenya.
10,000	Number of sales of stoves made in August 2015.
US$ 1 million	Initial capital invested into Business.
US$ 2.5 million	Revenue value as at 2015.

JIKOKOA™ Stove. Source: BURN

The company has partnered with Equity Bank to increase consumer purchases through an easy-to-pay loan across all branches in Kenya. Its partnership with M-KOPA solar provides potential customers with aflexible pay-as-you-go purchase option.

Are wood and charcoal the future of modern cooking energy?

BURN recognizes the role that culture still plays in the preference of cookstoves in the region, and has its team working to design an efficient firewood stove for the market. But even as it continues to manufacture the JIKOKOA, why promote the use of charcoal and wood fuel stoves in households when they have a negative effect on the environment?" We sought to understand how BURN's stove is part of the solution. And Boston had this to say, "at least 100,000 households use charcoal and firewood for cooking in Sub Saharan Africa. Our stove enables them to save up to 50% of charcoal consumption. If you are able to save half of charcoal consumption and multiply this value by 100,000 households, then that's obviously a better saving plan, at least for now, than having 100% of saving by say only 6 solar cookers as not many households are currently using the technology."

The JIKOKOA cookstove...

- Has a unique combustion chamber that allows in more air, reducing the amount of smoke produced.
- Cooks twice as fast as a normal stove.
- Allows you to control temperature while cooking.
- Uses 45% less charcoal.

Continued on page 6

"We feel that our product offers a two-thirds efficiency. We have spent two years working on its efficiency. And we continue to spend more time to make it even better for our customers. We aim to get it to 50% of households in the region" – Boston Nyer, Chief Product Officer

Advice to the Industry

It has not been a smooth ride for the company. Most of its raw materials are not locally available and are imported with only 30% of the valuable materials bought in Kenya. Generally, there is inadequate support for the industry locally. In Kenya, the market penetration rate currently stands at 3 to 4%.

BURN's advice to the industry is that it needs to have more people working in it, more products and more consumers in order to increase the market penetration rate.

Infographic: Technological characteristics of different cooking options

Cooking option	Technology characteristics
Traditional metal stove	Investment cost: US$ 3-6 Efficiency: 20-25% Heating value of charcoal: 33 MJ/kg
Three stone fire	Investment cost: US$ 0-2 Efficiency: 10-15% Heating value of fuelwood: 17 MJ/kg
Improved charcoal stove	Investment cost: US$ 14 Efficiency: 25-30%
Improved fuelwood stove	Investment cost: US$ 15 Efficiency: 25-30%
Kerosene Stove	Investment cost: US$ 30 Efficiency 40-45% Heating value of Kerosene: 48 MJ/kg
LPG stove	Investment cost: US$ 60 Efficiency: 55-60% Heating value of LPG: 49 MJ/kg
Electric stove	Investment cost: US$ 300 Efficiency: 70% Heating value: varies with stove material
Biogas stove	Investment cost: US$ 600-1500 Efficiency: 40-45% Heating value of biogas : 40 MJ/kg
Alcohol stove	Investment cost: US$20-35 Efficiency: 30-40% Heating value alcohol : 19-30MJ/kg

Source: OECD/IEA 2008, 2014. Images by International Lifeline Fund

ASD top 10 tweets - follow us on @solarkenya

1. What's holding back Africa's renewable energy entrepreneurs?
2. How Africa can show the world the way to a low-carbon future: 10 facts, 10 actions | Brookings Institution
3. UGANDA: Signs US$95 Million Agreement to Develop 44.7-MW Muzizi Hydroelectric Project
4. Naivasha biogas plant to supply Kenya Power 2.2MW
5. Hyacinth power plant to generate 35MW
6. Five solar power projects valued at $250M licensed in Zimbabwe
7. Africa's poorest people pay among the world's highest prices for energy
8. The R&B singer's 'Solar Academy' will train engineers to provide clean eco-energy for hundreds of millions
9. Zambia: renewable energy feed-in tariff at final stages
10. UK drops out of top 10 renewable energy ranking for first time

RE TRENDS EAST AFRICA is a quarterly newsletter produced by ASD in a deliberate move to share its knowledge and expertise of the East African region that spans over 25 years. We cover emerging innovations and technologies and showcase energy trends in the region to paint a picture of the sector and the direction it is taking. At ASD we provide a range of technical, consultancy and capacity building assistance in the renewable energy sector with a focus on commercial and rural energy solutions.
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