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at
the promotion of private initiatives in green
mini-grids
improving access to electricity in Kenya



GREEN MINI GRID
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Productive Use of
Energy Applications in
Off-Grid Energy
Systems

Workshop 2 July 2019

Brief



In association with



I-DEV INTERNATIONAL
Unlocking Business Potential In Frontier Markets

UNLOCKING ELECTRIFICATION & COMMERCIAL PRODUCTIVITY IN RURAL KENYA

Workshop Brief, July 2019

The following brief outlines highlights and take-aways from the workshop, titled “Productive Use of Energy Applications in Off-Grid Energy Systems Workshop,” which focused on the opportunity and challenges in rural electrification, economic development and mini grid businesses in Kenya. This event took place on 2 July 2019 and was hosted by the Kenya Ministry of Energy and the Green Mini Grid Facility Kenya, managed by AFD (France) and the Managing Entity (IED, I-DEV International and Practical Action Consulting). The workshop was attended by over 60 persons coming from the Ministry of Energy and related institutions, investors, private developers and NGOs. The purpose of the workshop was to facilitate dialogue between critical public and private sector actors needed to develop scalable, financially and environmentally sustainable solutions for increasing access to electricity in rural areas, on grid and off grid, that create greater opportunity for Kenyans. The workshops reviewed 1) Progress to date and what’s been done, 2) Constraints and challenges faced by various shareholders, and 3) Opportunities to maximize social benefit. The workshop began with opening remarks from Eng. Kiva, Secretary Renewable Energy of the Kenya Ministry of Energy, who emphasized progress in Kenya toward electrification, the plan to reach everybody by 2022 and the roles of the public and private sector.

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Summary & Highlights

- Mini grids are important to addressing the 0.5 billion people by 2030 who will need energy access, especially those in Africa; this will require 10s of 1000s of people/year that need to be reached to achieve targets.
- Kenya is at the forefront of innovation and electrification rates for Sub-Saharan Africa, yet even Kenya has a long way to go; and will need private sector and alternative off-grid energy solutions to hit its Vision 2030 goals including universal electrification by 2022.
- Productive Use of Energy (PUE) drives increased income generation via access to electrical equipment to drive industrial and commercial activities. PUE 1) makes energy supply by KPLC and mini grids more viable by raising energy load factor from 30% to 50%, 2) Helps support social services & increase market access to lower income groups, and 3) helps these communities generate greater income.
- AMDA, the Africa Minigrid Developers Association, gave the following statistics on members, emphasizing that they can help the Kenya government identify viable mini grid sites and implement them faster in unison. In addition, AMDA made a call to action to more regularly convene in follow on workshops to ensure that collaboration and momentum continues between parties that are all critical

to designing a long-term rural electrification solution for Africa, starting with Kenya.

AMDA Statistics: 133 – Number of Minigrids actively built out 2019-2020; 370 – Sites identified as viable with GIS and site visits; 54,396 – Connections through visible pipeline; 2,850 – Additional sites identified as likely viable through GIS tools.

- Equity Bank announced a plan to launch a new lending product geared toward PUE equipment financing in and around mini grid sites. Initial analysis was conducted by the GMG Facility Kenya with Equity Bank to understand the opportunity for investment in Western Kenya. GMG Facility Kenya and Equity Bank are now seeking a loan guarantee partner needed for the pilot of this new lending product that will finance maize/wheat milling, irrigation, ice making, energy efficient cooling/refrigeration equipment, other small appliances- and possibly e-vehicles.
- Key follow on action items were proposed to keep momentum from the workshop:
 - Host a financial modeling workshop between minigrid operators/developers, investors and government to understand policies, tariffs and type of capital and investments needed to build a viable model
 - Provide information and opportunities for donors and DFIs to fund mini grid and PUE pilots via direct grants and by backing loan guarantees to commercial and MFI lenders, capacity building to ensure lending products are properly designed, promoted and sold while the right improved energy efficient PUE equipment reaches small business operators to create long-term opportunities
 - Collaborate and convene in open dialogue to design clearer mini grid policy that incorporates more favorable terms to private mini grid operators including lower tariffs and longer operating agreements
 - Follow on sessions and similar workshops between public-private sector that foster partnerships between the various organization involved in agricultural and rural development and promote tactical, actionable solution building.

The Opportunity in Productive Use of Energy and Mini Grids for Kenya

Productive Use of Energy (PUE) or “productive use” refers to the development of improved commercial and industrial activities requiring electricity and that generate additional income for rural communities. In the context of green mini grids (GMGs), PUE has become a strong component of their business models because it 1) Diversifies and increases revenue streams to GMG operators, thus de-risking their model, 2) Increases local household and business demand for energy consumption, important to driving baseload energy demand that allows GMGs to operate more efficiently, cost effectively, and sustainably, 3) Increases local income generation by allowing GMG communities to produce new, greater and value-added products; preserve goods from spoilage; increase crop yields; and generate other benefits discussed throughout this report, and 4) Create added value to local communities to secure their support of the GMG operator, critical to long-term operations.



Figure 1. Opening remarks from Eng. Kiva, Secretary Renewable Energy of the Kenya Ministry of Energy, who emphasized progress in Kenya toward electrification, the plan to reach everybody by 2022 and the roles of the public and private sector.

Analysis conducted by the GMG Facility Kenya identified key opportunities to unlock productive use in Kenya through a series of field visits, interviews and market mapping. These core opportunities for wide-spread development, and that will need strong grant, impact investor and commercial investment to scale include:

- Milling (Maize, Wheat and other higher value grains)
- Cooling/Refrigeration (beverages, meats, etc)
- Ice Making (for fish and other preservation from loss)
- Irrigation for vegetables and other high value crops
- Small Appliances (other electric tools to boost productivity and income to local shops)

Ultimately PUE helps to boost economic development with mini grids or electricity as its base. Supporting GMG development and PUE activities in parallel will help Kenya to achieve its priorities for Vision 2030, and universal electrification by 2022 faster.

Critical to PUE and green mini grid success are these factors:

- Higher and ideally growing energy usage to drive down costs and increase base load- without this, neither KPLC or mini grid operators can make a profitable business case
- Compatible PUE appliances and equipment e.g. 3-phase AC, rugged for rural settings, fit to cultural contexts, energy efficient (as mini grid power is still higher cost), size and capacity to fit use cases
- Financing for community members to purchase PUE appliances and equipment – from banks and microfinance institutions (MFIs) to equipment purchasers, or to mini grid operators who can then build an asset financing and lending program in-house
- Grants and other patient capital to finance more pilots on PUE + mini grids to perfect the cost effective, scalable and sustainable model, including help standalone solar or standard equipment manufacturers conduct the R&D to adapt products to mini grid contexts; and other capital that will help to de-risk and prove out the longer term profitability model for commercial lenders
- Stronger linkages between PUE equipment distributors, financing mechanisms/banks/lenders, mini grid operators and other ecosystem enablers

Mini Grid PUE Case Studies: Examples of Early Success

Mini grid operators including Jumeme (Tanzania), Kijiji Power, PowerGen (Kenya), PowerHive (Kenya) and RVE.Sol shared their stories.

PowerHive. PowerHive has explored a broad range of productive use activities over the years. Key lessons learned are to focus on highly scalable/transferable activities rather than everything. It is hard enough to conduct and run efficient business in rural areas. Too many programs means too disparate and small results that are hard and inefficient to manage. Powerhive has since honed in on key PUE activities of Poultry, Internet Access, High Value Agriculture and...Electric Vehicles!

Poultry incubation, a project called Kuku Poa, initially focused on 1-off households supplied with small incubation units powered at the home, they discovered this caused too high a death rate of chicks. Today, women's groups can take out a loan and Powerhive will provide training on proper rearing and inputs such as the cages and incubator that are placed in a central location. Any woman in the community is eligible to participate and form a group. Powerhive also manages the sales, marketing and access to a committed buyer

of the chickens. This drives 40% ARPU for families, between poultry sales and use of manure to increase crop yields 3-fold.

Internet access is provided across the mini grid. All on the mini grid get basic access, with an option to boost their connection speed via an internet package for an additional fee. Average ARPU increase is 42% per household. Powerhive will explore future plans to create gig-economy type opportunities for day labor jobs, plus communities can access skills training online.



Figure 2. Rik Wuts, Co-Founder, Powerhive speaking on Kuku Paa, e-tuk tuks and more PUE activities in Kenya.

Powerhive has tested the promotion of electric cooking equipment in one of its sites and found a big increase in ARPU and benefits for the users in terms of clean air and convenience. However, load management is challenging and the company is developing technical options.

High value agriculture including tomatoes, onions and watermelon allow rural farmers to get access to a national, more lucrative vs. local market. Powerhive is piloting on its 1st farm this model that delivers a kit of agricultural improvement inputs that they believe can generate additional \$10,000 income per acre per year. For now, with an estimated upfront cost of \$6,000 per acre for improved inputs including irrigation equipment, fertilizer and pest control, grant funding and perfecting the pilot is critical before full roll out.

However, much of the effort is much beyond the capacity of the mini grid and the public utility companies and requires the active engagement of other stakeholders and institutions engaged in agriculture, livestock, fisheries, rural development etc.

Powerhive also estimates that electric vehicles, specifically 3-wheel tuk tuks with swapable rechargeable batteries (owned by Powerhive) can save 70% of the money typically spent on fuel and maintenance for drivers of vehicles powered by petrol or diesel. Their newest initiative will start piloting next month when the tuk tuks arrive.

Jumeme in Tanzania is focused on an island strategy supporting 100,000 people and 1,000 small businesses via their mini grids and productive use model. Their **Energy Aquaculture Nexus** project on Ukara Island in Lake Victoria is focused on creating a local, concentrated business base on the island by providing financing to local community members to catch and cool fish there, and in doing so increase their use of Jumeme's mini grid power.



Figure 3. Jumeme, Head of Sales & Marketing, Robert Wang'oe on ice making for fish preservation on the islands of Lake Victoria and delivery to Dar es Salaam.

Today it includes 16 full time dedicated fishermen, and 20 seasonal. Fish are frozen on site and then shipped and sold in Dar es Salaam. They are now exploring cage fishing whereby fishermen will own some of the cages themselves, and others will be contract hires. Jumeme currently has 18 commissioned or new sites in the works with a target of 1 ton of fish per day production. Focus is on producing local tilapia to replace over 50% of tilapia consumption in East Africa being imported from China today. Jumeme estimates the greater solar aquaculture equipment potential market in Africa will reach \$3B by 2030 with a current estimate at \$732M.

Kijiji Power on Lake Victoria has taken up the full value chain from market assessment, capacity building, financial literacy and entrepreneurship trainings to clients. Currently focused on improving agriculture and ice making/refrigeration. For agriculture, they have tested 4 sites with drip irrigation and sprinkler systems to improve crop yields. For ice making, the company tested 6 sites and 12 chest freezers to find that ice making or cold storage works best. When people hear a mini-grid is coming, they buy massive machines which aren't compatible with mini-grid. The upside: pilots showed that only 52% of people reported food shortage during the project instead of 92% previously, and there was a 74% increase in income to women in the community.

RVE.Sol has also discussed its pilots in PUE activities, focused on Kinyozi (local barbers), egg incubation and cinema halls.

Key challenges highlighted by all developers were: Huge upfront costs – hence need for government subsidies; high costs of electricity produced by GMGs and thus why energy efficient products and the right sized units to fit demand will be key; and of course, more time and resources to continue to pilot and perfect models in the local community and geographic context.

Stand Alone Solar, PUE and the Future Potential for Integration with Mini Grids

The standalone solar sector e.g. home solar lights and kits gained traction and wide spread use several years earlier than mini grids. Not surprisingly, there has been more progress to-date regarding products designed for a rural context. Standalone solar is often DC powered, which causes a critical compatibility issue in trying to adapt these products to mini grid settings which are typically AC powered. Separately, even many standalone solar units have much to improve in product quality, lifetime, fit to market, and fit to willingness and ability to pay. Alternatively, financing mechanisms need to be in place that make purchase of this equipment more palatable to the target low-income rural populations. Companies actively interested and seeking to pilot (or currently piloting) with the GMG sector include Sunculture (solar powered drip irrigation), Agsol (milling equipment), InspiraFarms (cold storage units) and SunDanzer (solar refrigerators).

Key Opportunities and points made:

- **Crop Irrigation:** Africa can increase agricultural productivity by 20x by moving water to where it needs to go, as was stated by one of the participants. Production of milk and grains all require a lot of water.
- **Cold Supply Chain.** Cold storage is critical to dairy, flower and fresh vegetable produce for export sectors. If communities want to play in these sectors, effective cold storage solutions- cold rooms in some cases, ice or smaller refrigerators in others. No cold storage, no export market. Also, realistically, there is a need for stronger market linkages for rural communities to access these opportunities, and this will require capacity building for this type of productive use and developing a working cold supply chain.

Financing Models to Unlock Greater Opportunities



Figure 4. Tsakane Ngoepe, Portfolio Manager, AHL Venture Partners speaks on the opportunity and ongoing challenges of mini grid business models, which much act as energy providers as well as equipment financing and PUE training partners to communities.

Access to capital for mini grid development or productive use activities continues to be a challenge, and in part because the concept of green mini grids paired alongside productive use is still nascent- in the early discovery years. Furthermore, high tariffs on mini grid energy, short-term operating licenses and other policies that signal concerns to private investors and the fact that these models are meant to reach the last mile and rural low income communities with limited access to higher margin sales and distribution markets makes this all the more complex. Mini grids and installation of high quality commercial grade PUE equipment comes with these prohibitive expenses: High capex costs to build the mini grid systems, negotiation for land/rights/terms that appeal to the local community leaders, and cost to modify, deliver and maintain PUE equipment, then connect with or build PUE lenders and more. Because of this, government support is critical to open the market opportunity faster and make GMG models financially viable; grant funders and donors are critical to helping GMG operators and PUE equipment providers test and perfect a viable model, and prove to commercial banks and MFIs the business case for them to lend toward these models.

Investors like AHL, who spoke on the Finance panel, shared experiences investing in PowerGen, a Kenya mini grid operator several years ago; as well as investments in Rent-to-Own, an asset finance company; and MKopa, a pay-go home solar company.

Some take-aways that arose in the Finance panel moderated by Patricia Chin-Sweeney, IDEV, with Kevin Schreiber, Customer Success at PowerGen; Tsakane Ngoepe, Portfolio Manager at AHL Venture Partners; and Jane Dougherty from CrossBoundary Energy's Mini-Grid Innovation Lab, include:

- Companies like Powergen have had to be opportunistic in getting grant funding as there are few mechanisms specific to addressing this gap in Access to Asset Finance for Mini Grid Ecosystems combination. Grants have been secured by PowerGen to pilot offering appliance financing to allow low

income rural communities to pay for larger appliances, whereby the mini grid operator acts as an asset finance lender

- Pilots for financing have been offered by USAID, DFID, World Bank to name a few
- Beyond proof of concept which grants can support, there are simply not enough parties offering asset financing and debt for this type of model – whether it be a lending facility housed within the GMG operator business model, or external to it e.g. a local MFI, commercial bank, impact investor or other



Figure 5. Eric Naivasha, Equity Group Foundation speaking on the opportunity to unlock commercials loans for PUE equipment near mini grid sites in Western Kenya

- AHL suggested that while many of the early concerns around mini grid business model viability in general are lessening as GMG operators begin to prove success, the sector is still in early stages and PUE models and industries/activities of focus must be tested broadly to ensure a fit with the local community, culture, context and market demands and linkages to a larger market that can be made. If GMG operators can 1st leverage grant funding to do testing & pilot – not just to test ability to develop credit history but also ability to deliver – then other private impact and financial investors will feel better about getting results & performance of program. Ultimately these companies then need debt financing, not equity to fuel the ongoing asset financing model.

All these specific points are well aligned with findings from the GMG Facility Kenya's recently analysis on high potential PUE markets that tie in with the mini grid companies they've supported mostly in Western Kenya. The analysis findings identified 3 key challenges to unlock and catalyze the PUE financing ecosystem: 1) Lack of Linkages and Active Dialogue Between Mini Grid Operators, PUE Equipment Manufacturers and Distributors, and Financing to Ensure Viable Solutions are Developed; 2) Risk Mitigation Strategies to Attract Commercial Lenders and Investors, 3) Availability of Financing Mechanisms Designed for GMG business models and contexts, and that ultimately will require capacity building to train loan officers, lenders, etc. on the product and why it is compelling.

Equity Bank and Equity Bank Foundation also gave an exciting announcement, presented by Eric Naivasha, General Manager- Energy and Environment of Equity Group Foundation. As a result of close work with the GMG Facility Kenya to identify key opportunities for PUE financing tied to mini grids, and the strongest PUE sectors of growth – Equity Bank will develop a new lending product that provides asset finance for PUE equipment purchase for Milling (Maize, Wheat and other higher value grains); Cooling/Refrigeration (beverages, meats, etc); Ice Making (for fish and other preservation from loss); Irrigation; Small Appliances (other electric tools to boost productivity and income to local shops); and if possible, e-vehicles, such as those that Powerhive will soon be piloting in Kenya! This addition of e-vehicles was added after hearing the case studies of operators who presented during the workshop, demonstrating the importance in more frequent

convenings! Of course, two challenges to realizing this model and proving the business and financial case to other commercial lenders will be: 1) National interest rate caps on commercial lenders mean commercial banks must reject any overly risky loan, and thus the business case must be fully proven via a subsidized pilot- or risk not being approved by bank management; and 2) as a solution to this, the GMG Facility Kenya has worked with Equity Bank to structure an initial draft model of the loan product, and a loan guarantee facility that requires to look to DFIs and donors to fund. For now, given the GMG Facility Kenya's initial due diligence and research into the market opportunity, the proposed loan guarantee and pilot only equates to less than \$1M needed from a guarantor to Equity Bank. This pilot could then be the case study that drives other commercial banks, MFIs and other lending groups in a similar direction to unlock local rural productive use and build new mini-hubs of economic growth.

The Role of Ecosystem Enablers

Who are Some of the Actors:

- Ministry of Energy (MoE) responsible for strategy and planning in the energy sector such as Integrated Energy Plan (national plan to ensure counties, communities and national governments align on a common goal and efforts), EPRA (Energy and Petroleum Regulatory Authority),
- **Government Initiatives:** KOSAP (funded by World Bank)
- **Intermediaries/NGOs/Associations:** Africa Minigrid Developers Association (AMDA), CLASP, Mini-Grid Innovation Initiative/Crossboundary Energy, Energy4Impact
- **DFI-Funded Initiatives:** Green Mini Grid Facility Kenya (GMG Facility Kenya), DFID Access to Clean Energy Program

The Government Perspective: The workshop began with opening remarks from Eng. Kiva, Secretary Renewable Energy of the Kenya Ministry of Energy, who emphasized progress in Kenya toward electrification. The Kenyan Government is committed to addressing this issue and engaging public and private actors to do so. They rely on the feedback from private sector and operators to understand policies/regulations/strategies needed to incentive growth and ensure success and to improve productive use of energy. On the upside, according to Nickson Bukachi from the Energy and Petroleum Regulatory Authority (EPRA) new green mini grid regulations can be expected to be released soon and with more focus on embracing the benefits in collaboration and strengthening private mini grids. There will be a public review period for the proposed regulations. When asked how the EPRA regulation will look in a few years, Nixon said “ new things every day mean we must be more adaptive” signaling a change in government’s willingness to collaborate and adapt to achieve the universal goal of universal energy access and long-term sector financial sustainability. Munguai Kihara, Ministry of Energy, also added that government’s focus has pivoted from grid extension to a mixed solution that incorporates alternative off-grid solutions including mini grids. He and Nixon encouraged private operators and investors to see government as a partner.

Current initiatives and points presented by government:

- Ministry of Energy in their GIS mapping and 5- year investment horizon projects 870,000 new connections in Year 1, 1.2M IN Year 2, 1.63 in year 3, 710,00 in year 4 and 890,000 new connections per annum on the year 5 and onwards.
- Through the KOSAP programme component 1, a \$40M initiative backed by World Bank, core focus is on 14 northern counties categorized by the Commission of Revenue Allocation (2013) as marginalized: Turkana, West Pokot, Samburu, Marsabit, Isiolo, Mandera, Wajir, Garissa, Tana River, Lamu, Kwale, Kilifi, Taita Taveta and Narok.



Figure 6. Figure 5. A full house gathered to hear ecosystem enablers- government to AMDA- discuss how better to collaborate toward GMG PUE solutions.

- Challenges in these marginalized communities include insecurity and land ownership structure which is communal; Community engagement and acceptance is therefore important. Another challenge is that new connections drive rapid increase in energy use, but also a quick plateau in consumption vs. in urban areas, where there is continual increasing demand in consumption.
- in addition, the consumption of new consumers is low. The KPLC presentation showed a 7.2M connected customers in 2019 from 1M in 2003 but that the consumption per connection has reduced. This could be because the last mile project brought in more rural customers whose average consumption is 8-13 kWh per month as compared to the urban population whose consumption per capita is 40-50 kWh per month. This is partly because of differences in income but also because rural populations don't have access to equipment due to lack of financing to acquire them, due to unavailability of the products in rural areas and lack of information.
- Increasing access and use of PUE applications in rural areas to increase demand is critical to creating an attractive, viable business model. Demand can be increased by introducing newer and more energy efficient electric cook stoves, introducing mobility products like electric vehicles, Tuk-tuks, trains etc.

The PUE Equipment Company & GMG Operator Perspective: Green mini grids are a complex business model but one that is an effective and comprehensive solution to rural electrification and rural Kenya economic development. Some solutions for government posed by these players were:

- Friendlier and more adaptive tariff models that factor in the realities and high cost of mini grid energy would significantly unlock growth, attract investors by signaling stronger profits potential and more.

- Help to scale productive use appliances by looking at models in India, Bangladesh and the US (several decades ago), where government provided PUE and solar equipment subsidies to drive rapid adoption and scale of clean energy solutions; and subsidies that factor in timebound results, clear KPIs and effective displacement of costs from one aspect of Kenya's productivity to another (e.g. subsidize clean energy and PUE equipment delivery, while increasing costs of imported bananas or tilapia- PCS- I made this up...should check I understood right)
- Subsidies on capex (capital expenses) intensive improvements that help Kenya achieve its energy goals. For example, the upfront cost to purchase and install a solar cold storage facility or cold room (capex) means many cannot do this, yet a cold room or larger unit proves much more effective in driving export value than a small refrigeration or ice making unit for industries like green beans, flowers.
- Consider additional criteria on mini grid site selection – for example, since agriculture and agricultural exports are a key driver of Kenya's growing economy, encourage mini grid operators to develop their sites in areas where export produce can further expanded or where mini grids can rely on existing large agriprocessors and exporters as their anchor energy customer, then develop PUE activities alongside large companies to develop their produce supply chain. This model creates a win-win scenario where technical assistance to local communities on producing to an export standard is shared by the mini grid operators and large agriprocessor buyers.

Next Steps Proposed

Below are some of the actions proposed to continue momentum and timely progress to keep Kenya on target to achieve universal electrification supported by mini grids.

- Host a financial modeling workshop between GMG operators/developers, investors and government to understand policies, tariffs and type of capital and investments needed to build a viable model
- Provide information and opportunities for donors and DFIs to fund GMG and PUE pilots via direct grants and by backing loan guarantees to commercial and MFI lenders, capacity building to ensure lending products are properly designed, promoted and sold while the right improved energy efficient PUE equipment reaches small business operators to create long-term opportunities
- Collaborate and convene in open dialogue to design clearer mini grid policy that incorporates more favorable terms to private mini grid operators including lower tariffs and longer operating agreements
- Follow on sessions and similar workshops between public-private sector that foster partnership and tactical, actionable solution building

Attendees List

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Agenda

Productive Use of Energy Applications in Off-Grid Energy Systems Workshop 2 July 2019 – Intercontinental Hotel, Nairobi, Kenya

Schedule	Session	Presenter
8:00 – 8:30	Breakfast / Registration	
8:30 – 8:50	Opening Remarks	Ministry of Energy PS DFID/ AFD
8:50 – 9:00	Workshop Introduction & Objectives	GMG Facility: Gerard Hendriksen
9:00 – 9:40	Industry Perspectives: <i>Assessing Potential for PUE's in Major Regional Off-Grid Energy Initiatives</i>	MC: Patricia Chin-Sweeney, I-Dev International
9:00 – 9:10	Last Mile Connectivity	Kenya Power
9:10 – 9:20	KOSAP	Ministry of Energy
9:20 – 9:30	Q&A	MC: Patricia Chin-Sweeney
9:30 – 10:10	PUE Business Models: <i>Case Studies with Mini-Grid Systems</i>	MC: Patricia Chin-Sweeney
9:30 – 9:40	PUE pilot programs at Western Kenya sites: Kuku Poa, IT Access, Irrigation	Powerhive
9:40 – 9:50	PUE pilot program in Lake Victoria: Aquaculture	Jumeme
9:50 – 10:00	PUE case studies from Lake Victoria Case Studies	Renewable World/Kijiji
10:00 – 10:10	Q&A	MC: Patricia Chin-Sweeney
10:10 - 10:30	Tea Break & Networking Session	
10:30 – 11:00	PUE Business Models: <i>Case Studies with Stand Alone Systems</i>	MC: Patricia Chin-Sweeney
10:35 - 10:40	PUE- Experiences from Energy 4 Impact in East Africa	Energy 4 Impact
10:40 – 10:50	PUE Appliances: Solar water pumps market support program	CLASP
10:50 – 11:00	Q&A	MC: Patricia Chin-Sweeney
11:00 – 11:40	Financing Panel: <i>Discussion on existing financing models, sources of financing, learnings from pilot programs</i>	Moderator: Patricia Chin-Sweeney Panelists: CBEA, Powergen, AHL Venture Partners
	Q&A	MC: Patricia Chin-Sweeney
11:45 – 12:15	Ecosystem Panel: <i>What role do eco-system enablers have to play in promoting PUEs?</i>	Moderator: AMDA Panelists: Ministry of Energy/ ERC, RVE Sol, SunCulture, Inspira Farms
	Q&A	MC: AMDA
12:20 – 12:50	GMG Facility Presentation: Mini-Grid PUE Guides and Access to Finance Pilot Program	GMG Facility, Equity Group Foundation
	Q&A	MC: Patricia Chin-Sweeney
12:50 – 13:00	Closing Remarks	Ministry of Energy or AFD
13:00 – 14:00	Lunch	

List of Presentations

	Presentation	Presented by
1	PUE Workshop 2 July 2019 – KPLC	Samson Ondiek
2	PUE Workshop 2 July 2019 - KOSAP	Myra Mukulu
3	PUE Workshop 2 July 2019 - Powerhive	Rik Wutz
4	PUE Workshop 2 July 2019 - JUMEME	Robert Wang'oe
5	PUE workshop 2 July 2019 -Kijiji	Geoffrey Mburu
6	PUE Workshop 2 July 2019- E4I	Diana Kollanyi
7	PUE Workshop 2 July 2019 – CLASP	Makena Ireri
8	PUE Workshop 2 July 2019-AMDA	Aaron Leopold
9	PUE Workshop 2 July 2019 - Financing	Patricia Chen-Sweeney

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