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INVESTING IN CLEAN ENERGY MARKETS

Beyond the Grid Fund for Africa (BGFA) - Zambia

OUTCOME REPORT PRIVATE SECTOR STAKEHOLDER CONSULTATION WORKSHOP

LUSAKA, 17- 19 SEPTEMBER 2019

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DATE: 14 NOVEMBER 2019

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LIST OF ABBREVIATIONS

BGFA - Beyond the Grid Fund for Africa

BGFZ – Beyond the Grid Fund for Zambia

DoE – Department of Energy

ERB – Energy Regulation Board

ESAP - Electricity Service Access Project

ESP – Energy Service Provider

MoE – Ministry of Energy

NEFCO – Nordic Environment Finance Corporation

REA – Rural Electrification Authority

REEEP – Renewable Energy and Energy Efficiency Partnership

SAEP - Southern Africa Energy Programme

1 INTRODUCTION

The Beyond the Grid Fund for Zambia (BGFZ; https://www.bgfz.org/), funded by the Swedish Government and implemented by the Renewable Energy and Energy Efficiency Partnership (REEEP), was launched in 2016 and aims to increase access to electricity by mobilising private investment in off-grid rural electrification. It does this by providing smart incentives to firms to enter into or expand in the Zambian market and provide a high volume of energy services over a defined period. Through BGFZ, the Swedish Government contracted four energy service providers in July / August 2017, which have since then deployed more than 150,000 connections, translating to more than 750,000 people gaining access to clean and affordable off-grid energy (for live data on BGFZ results, see https://edison.bgfz.org/).

Based on the promising results of the approach in Zambia, the Swedish government has provided additional funding amounting to €20 million for expansion of this programme in Zambia. In addition, the programme aims to replicate this approach in three more countries in Western and Southern Africa (Burkina Faso, Liberia and Mozambique, with an allocation of €10 million each). With the inclusion of other countries, the programme is now called the Beyond the Grid Fund for Africa (BGFA). BGFA is managed by the Nordic Environment Finance Corporation (NEFCO) as Facility Manager and implemented by REEEP as Implementation Manager.

1.1 MAIN OBJECTIVES OF THE WORKSHOP

During the first 6 months of BGFA implementation, REEEP is conducting a market scoping phase in all four BGFA focus countries, including Zambia, and engaging with stakeholders to establish the evidence and context required for the design and development of the new funding rounds. As part of this process, REEEP held a Stakeholder Consultation Workshop in Lusaka, Zambia, from 17th to 19th September 2019, to collect feedback on the main challenges, problems and opportunities identified by a wide range of stakeholders in the off-grid market.

1.2 OVERVIEW OF DISCUSSION GROUPS

The workshop focused on three off-grid energy market sectors, namely mini-grids, solar home systems (SHS) and bioenergy (full agenda in Annex 1).

Each market sector was addressed on a separate day and on each day, four key themes were discussed in breakout groups. The group discussions focused mainly on incentives, business models and coordination required for market development. Furthermore, the discussions addressed the existing opportunities for the public sector to support the private sector in a meaningful way, and sought to gain an overview of the current market situation from the perspective of different stakeholders in Zambia as well as identify synergies.

The discussion themes for each off-grid market sector were as follows:

Mini-grids	Solar home systems (SHS)	Bioenergy
Theme 1: Defining energy service and service levels and how to incorporate other aspects of the service (appliances, energy efficiency etc). **Theme 2**: Incentivising productive use and defining the role of mini-grid operators in driving the "productive" marketplace. **Theme 3:** Determining the right incentive level and how should it be targeted and deployed. How should it be monitored, and tracking which KPIs (technical, financial, environmental/social)? **Theme 4:** Coordination between public and private sectors and avoiding duplication of efforts.	**Theme 1:** Incentive models that can penetrate deep rural areas; determining the right incentive level and how it should be targeted and deployed. **Theme 2:** How to incentivise productive use? **Theme 3:** Deepening the value chain – gender and distribution networks; how to engage/involve local players. **Theme 4:** How to ensure coordination between public and private sectors and avoid duplication of efforts.	**Theme 1:** Promising business models for bioenergy (EE cook stoves and HH level biogas); how to package product offerings as a service? **Theme 2:** Role of the public sector; need for regulation, awareness raising and capacity building. **Theme 3:** The preferred incentive mechanism and how it can be targeted and deployed; link to carbon finance. **Theme 4:** Potential to use biomass and biogas for electricity generation for mini-grids.

The workshop participants were divided into groups for breakout sessions discussing each of the topics. Guiding questions discussed in each of the groups are indicated in Annex 6.

The first day of the workshop, 17th September 2019, included the official opening and the session on mini-grids; 113 participants attended. The second day of the workshop focused on SHS (56 participants) and the last day of the workshop focused on bioenergy (44 participants). The list of participating institutions and companies on each workshop day is indicated in Annex 7.

2 PROCEEDINGS OF THE WORKSHOP

2.1 INTRODUCTION TO BGFA

Andreas Zahner made an introductory presentation on behalf of REEEP. He explained that BGFA has an initial funding target of €48 million (including €20 million for Zambia) provided by the

Government of Sweden. BGFA is managed by NEFCO as Facility Manager and implemented by REEEP as Implementation Manager and aims to run from 2019 to 2024.

The programme aims to provide sustainable clean energy services for underserved people in rural and peri-urban areas in Burkina Faso, Liberia, Mozambique and Zambia through an expansion of a successful approach implemented in Zambia since July 2017. The Beyond the Grid Fund for Zambia (https://www.bgfz.org/) injects public sector funding to overcome early structural challenges in the market, incentivize early-stage start-up and medium-term scale-up needs of Energy Service Providers and create conditions for long term sustainability and commercial investment. Zahner indicated that funds will be deployed as grants. However, the private sector companies are required to provide equity and own funds as in-kind or co-funding contributions from third-party financiers. The BGFA aims to reach 5 to 10 million people in rural and peri-urban areas in the target countries. The envisaged timeline for BGFA is as indicated below.

Q3 2019-Q1/2 2020	Market scoping
September 2019	Stakeholder workshop in Zambia
Q1/2 2020	Finalisation of recommendations to the BGFA Steering Committee for country funding window(s) and funding approaches
Q2 2020	Detailed programme and procurement design
Q3 2020	Launch of Call for Proposals
Q1 2021	First disbursements of funding

2.2 OPENING STATEMENTS

The Stakeholders Consultation Workshop was officially opened by the Honourable Minister of Energy, Mr. Matthew Nkuwa, MP. Also in attendance were Ms. Karin Sverkèn, the Head of Development Cooperation at the Swedish embassy, Mr. Stefan Lutz, the Director for KfW Lusaka Office, and representatives of government institutions, other cooperating partners and the private sector.

2.2.1 THE HONOURABLE MINISTER OF ENERGY, MR. METTHEW NKUWA, MP

In his keynote speech, the Minister stressed the importance of and need for off-grid energy solutions. He noted that over 60% of the Zambian population has no access to electricity and emphasised the need to invest in off-grids solutions if Zambia is to meet the SDG7 and the Sustainable Energy for all goals by 2030. He echoed the importance of private sector engagement in planning and implementation of rural electrification programmes. He urged all cooperating partners to ensure that there is no duplication of efforts but to complement and act on existing gaps. He assured government support and commitment to facilitating the development of the off-grid renewable energy space in Zambia. The Minister urged all government institutions such as the ERB and REA to cooperate closely and support the implementation of initiatives such as the BGFA that ultimately improve the lives of poor Zambians. He urged cooperating partners to come on board so that BGFA can grow and expand its scope and impact. The Minister expressed his gratitude to the Swedish Embassy and the people of Sweden for considering the second-round implementation of the programme. He extended his gratitude to NEFCO, the facility manager of the BGFA and to REEEP, the Implementing Agent on behalf of the Embassy of Sweden.

2.2.2 GERMAN DEVELOPMENT BANK - KFW

The Director of the KfW Lusaka office, Mr. Stefan Lutz, reiterated in his welcoming remark the support of the German government for the development of the energy sector in Zambia, specifically for grid infrastructure. Mr. Lutz indicated that KfW is assessing potential opportunities of providing additional funds to the BGFA programme.

2.2.3 THE EMBASSY OF SWEDEN IN LUSAKA

The Embassy of Sweden in Lusaka was represented by Ms. Karin Sverkèn, Head of Development Cooperation. In her opening remarks she indicated that Sustainable Development Goal 7 sets a target of universal access to affordable, reliable and modern energy by 2030, and noted that we are still far from reaching that target. Extending the grid to all rural and remote areas can be technically difficult and very expensive. Therefore, decentralised off-grid energy services, if they are more affordable and accessible, are viable alternatives to expansion of the national grid. She indicated that access to modern energy can be truly transformative and make it easier to undertake productive activities. Sweden has therefore made it a priority to work with a broad range of partners towards achieving SDG 7. Further, she re-emphasised the importance of the National Off-grid Energy Task Force to address and improve regulatory and market systems and to consult and coordinate efforts among stakeholders.

She indicated that the Beyond the Grid Fund for Zambia (BGFZ) received the prestigious 2019 Ashden Award for Innovative Finance . The Swedish embassy is even more proud and happy to be able to expand the concept, here in Zambia as well as Burkina Faso, Liberia and Mozambique. The embassy was happy to partner with NEFCO and with the expert team from REEEP, who worked with Sweden in the first round in Zambia and will continue with implementation of the programme.

2.3 POSITIONING STATEMENTS

2.3.1 DEPARTMENT OF ENERGY (DOE)

The Department of Energy, part of the Ministry of Energy, is responsible for energy policy formulation and implementation. The positioning statement was made by Ms. Harriet Zulu, Acting Assistant Director. The full presentation, focusing on policies supporting private sector participation in rural electrification and envisaged policy direction for rural electrification in Zambia, can be found in Annex 3. In her presentation, Ms. Zulu gave an overview of the electricity space in Zambia indicating how renewable energy fits into the sector. She mentioned a number of government initiatives supporting private sector participation. In concluding her presentation, Ms. Zulu emphasised the importance of electricity in driving socio-economic development in rural areas and the country at large. She indicated government's desire and need to diversify the generation mix so as to increase access to electricity. She called for concerted efforts by the government, the cooperating partners and the private sector in accelerating rural electrification. Further, she made an assurance that government will continue putting in place favourable policies to encourage more participation of the private sector in rural electrification.

2.4 RURAL ELECTRIFICATION AUTHORITY (REA)

The mandate of the Rural Electrification Authority (REA) is to provide electricity infrastructure in rural areas using appropriate technologies in order to contribute to the improvement of the

quality of life. REA was established by Act of Parliament No. 20 of 2003. Mr. Patrick Mubanga, Director of Technical Services at REA, outlined REA's off-grid initiatives to accelerate rural electrification in Zambia (please see the presentation in Annex 4). He indicated that the current rural electricity access rate is 4.4% from grid power and 7.4% from off-grid services. He mentioned that the REA is actively involved in promoting renewable energy for rural electrification.

REA considers private sector participation in rural electrification key, especially in implementation of off-grid technologies. Some of REA's initiatives that promote private sector participation include capital subsidies in line with the REA Act, a Smart Subsidy and Off-grid Loan facility under ESAP, Public Private Partnership Models and project feasibility studies to identify sites which could be auctioned to private developers. In addition, REA is developing the GIS Least Cost Geo-spatial Electrification Plan Platform /National Electrification Strategy under ESAP. REA also shared lessons learnt from implementing off-grid projects. In concluding his presentation, Mr. Mubanga indicated that REA has a huge task in electrifying all rural areas of Zambia and that the Authority cannot undertake this mammoth task alone. Therefore, there is need to partner with the cooperating partners and the private sector.

2.5 ENERGY REGULATION BOARD (ERB)

The Energy Regulation Board (ERB) is mandated to regulate the energy sector in order to ensure the efficient provision of reliable and quality energy services and products. Mr. Boyed Chilembo, Manager of Renewable Energy at ERB, made a positioning statement on behalf of the ERB focusing on regulations for the off-grid sector in Zambia (please see the presentation in Annex 5). ERB outlined recent regulatory developments and incentive frameworks developed in support of increased private sector involvement in the mini-grid space. A regulations framework was adopted in October 2018. It is currently undergoing road testing and will be gazetted after October 2019. Furthermore, ERB is working on a regulation to address grid encroachment. The presenter also gave a timeline for ongoing work on off-grid regulations. An overview of the current scenario for mini-grids in Zambia was also presented. ERB reaffirmed the government's interest in cooperating with the private sector.

3 SUMMARY AND KEY OUTCOMES FROM DISCUSSSION GROUPS

A summary of issues, outcomes and key recommendations arising from the discussion groups on the three workshop days are outlined below:

3.1 MINI-GRID WORKSHOP, 17 SEPTEMBER 2019

3.1.1 MINI-GRID MARKET OVERVIEW

The market overview for the mini-grid sector in Zambia was provided by REA. REA indicated that the mini-grid market in Zambia is still at an early stage. Government objectives are to increase the national electrification rate to 66%, with urban areas reaching 91% and rural areas 51% by 2030. Mini-grids are expected play a substantial role in achieving these access rates. The presentation also highlighted a number of initiatives in Zambia aimed at growing the mini-grid sub sector – i.e. the BGFA, IAEREP, ElectriFi and the ESAP. These initiatives provide an

opportunity for the private sector to invest in mini-grids. REA indicated that the REA Act includes a provision for capital subsidies to the private sector. Further it was explained that REA is willing to work with the private sector on project feasibility studies and on providing information on available potential mini-grid sites for development. The presentation also highlighted a number of the key challenges faced by mini-grid developers, which included low ability to pay in rural areas, lack of access to finance, lack of information on potential sites, low levels of return on investment and encroachment of the grid. REA also shared the lessons learnt from planning, developing and operating mini-grids in Zambia. Concluding the presentation, REA emphasised the importance of the private sector in growing rural electricity access rates. The full presentation can be found in Annex 8.

3.1.2 THEME 1: DEFINING ENERGY SERVICE AND SERVICE LEVELS AND HOW TO INCORPORATE OTHER ASPECTS OF THE SERVICE (APPLIANCES, ENERGY EFFICIENCY ETC)

KEY OUTCOMES, ISSUES AND CONCERNS

REEEP started by presenting the multi-tier framework used in the first funding round of the Beyond the Grid Fund for Zambia (BGFZ), which defined energy service levels along six tiers using metrics on watts, availability (Wh/day, h/day), number of lights and appliances that could be supported by the energy service. The group noted that in the context of mini-grids it is more relevant to focus on electricity rather than broadly on energy. A focus on energy services (rather than simply Wh) was still seen to be relevant also for mini-grid providers as mini-grid operators often market their offer to customers as an energy service rather than requiring payments per kWh. As such the group did not see a problem with the way that the energy service levels were defined for mini-grids. Some mini-grid providers also sell appliances, or at least partner with appliance providers. The participants did however note challenges related to monitoring, as the companies should provide data that can be used to determine all required metrics for each customer in a way that is not based on assumptions.

Focus on Wh/day is the most directly relevant metric, but the levels of the existing tiers should be reviewed as the energy demand would likely be higher than reflected in the current framework. The service levels should still first and foremost be determined by demand - tier ranges are used by the companies for load profiling in general but not in a pre-determined manner and as such the tier level should be determined by actual consumption data. Other metrics on quality and availability of the service could be considered. With reference to development impact and overall advancement of energy access, it was noted that even if Wh/day is used as a metric, we should find a way to differentiate between the value of providing a large amount of power to a high consuming customer vs. serving a larger number of low consuming customers.

KEY RECOMMENDATIONS FOR BGFA

- Key metrics could include Wh/day in combination with metrics on quality and availability – e.g. hours per day, interruptions/downtime, tariffs
- Requirements on e.g technical response times and technical standards can also be used to ensure quality of the service
- Focus on energy services is not irrelevant for mini-grid providers and the existing multi-tier framework could be reviewed for verifiability/applicability with a number of mini-grid providers

- BGFA should review existing frameworks and definitions from ERB, REA and MoE, such as the new mini-grid policy framework, which includes a number of relevant standards and tariff models
- Consider differentiating the energy tier levels for households, productive use and institutional as the latter two have usually higher power requirements compared to households
- Review the existing tier levels as the energy demand for mini-grid customers is likely to be higher than in the current multi-tier framework
- Tier levels should ideally be determined by actual consumption data (if the mini-grid is equipped with related technology)

3.1.3 THEME 2: INCENTIVISING PRODUCTIVE USE AND DEFINING THE ROLE OF MINI-GRID OPERATORS IN DRIVING THE "PRODUCTIVE" MARKETPLACE

KEY OUTCOMES, ISSUES AND CONCERNS

Mini-grid developers introduced their business models:

- One was grant funded and focused on agricultural processing (oil pressing machines).
- The other had prepared an early stage model whereby it would only connect SMMEs to the mini-grid (micro-businesses like shops, restaurants, bars, hairdressers, carpentry workshops, steel workshops etc) while households would be provided with SHS (Ratio 200 households to 10 SMMEs).
- Another project idea was presented for rice growing areas, which included rice polishing to reduce transport costs and the gasification of rice husks to generate electricity for a mini-grid. The provision of bundled internet and TV services was seen as relevant in the context of productive use in as much this provision contributes to revenue generation.

Schools were mentioned as a potential target market, as teachers have a high ability to pay; however, schools are usually community owned and thus unable to pay for capex costs or tariffs adequately. The concept of Anchor Clients (either these clients are available from the beginning or they must be promoted and financed to come into existence) and the Mini-grid ABC model - building on 3 sets of customers - Anchors (A) Businesses (B) and Community (C) - were discussed.

If productive use clients are already present they may be connected, but it would be difficult to "fund them" into existence using the BGFA model and approach. It was suggested that mini-grid tariffs for productive use consumers must be comparable to the cost of running a diesel generator. As for mini-grid stability, it was mentioned that productive use creates uneven loads and requires thoughtful concepts and coordination.

In general, participants supported the idea that productive use customers can create valuable revenue streams for mini-grid operators and (as a virtuous circle) increase economic development in rural areas. It was agreed in the group that each mini-grid constitutes its own site-specific ecosystem, a complex network of relationships between multiple players; there is not one productive use solution that fits all villages and locations in rural and peri-urban Zambia.

In the agricultural space the key applications for productive use were seen as milk chilling, fish drying and oil pressing, or more broadly applications that would reduce logistics costs or allow

for more efficient local processing. Mini-grid developers were seen as key players to promote productive use on their selected sites and to involve villagers, entrepreneurs and coop groups at the concept development stage.

KEY RECOMMENDATIONS FOR BGFA

- It was mentioned that BGFA could support the financing of productive use assets; a cooperation between BGFA and development banks was recommended in this regard.
- Adding productive use elements to the mini-grid increases costs but lowers risk (but not necessarily payback time). Risk reduction comes through the sustainability element.
- More information and data is required related to productive use in the agri-food space. There seem to be many opportunities, but we know very little about them in the Zambian market context specifically.
- Capacity building is required as ancillary support, for business development in rural areas; more technicians are needed; training is required across the spectrum.
- Bespoke "productive use" applications are most likely required, i.e. it was agreed that appropriate productive use solutions would be very specific to one location.

3.1.4 THEME 3: DETERMINING THE RIGHT INCENTIVE LEVEL FOR MINI-GRID PLAYERS AND HOW INCENTIVES SHOULD BE TARGETED AND DEPLOYED, MONITORED AND TRACKED (WHICH KPIS - TECHNICAL, FINANCIAL, ENVIRONMENTAL/SOCIAL)

KEY OUTCOMES, ISSUES AND CONCERNS

The issue discussed in this group was that of "incentives" for providing energy services via a mini-grid. The participants discussed how these incentives should be structured, routed, monitored, verified, etc. so as to ensure that high quality connections are deployed using an environmentally and economically sustainable approach?

The discussion started with questions to the BGFA team and one of the Energy Service Providers (ESP) contracted under the first financing round in Zambia (BGFZ 1) regarding lessons learnt through the programme for the mini-grid sector. Some initial takeaways included that the incentive structure for mini-grid energy services was not adequate to bridge the viability gap of deploying mini-grid connections in rural areas or for capturing the total lifetime value of a mini-grid energy service. BGFZ 1 expressly prioritised rapid deployment of Tier 1-2 energy service subscriptions (ESS) to the advantage of SHS-distribution models over mini-grid models. However, discussants agreed that mini-grid energy services are significantly longer-lasting, provide more flexibility and higher tier energy services – as well as supporting a more open "productive use" framework – than SHS energy services, and as such these benefits should be incorporated into the BGFA's future valuation of energy services.

The ESP contracted under the first round (BGFZ 1) argued strongly in favour of the BGFZ 1 approach, which was seen to balance the goals and requirements of public and private sector actors well. It achieved this by providing relatively early-stage companies with capital-intensive business models with grant funding essentially as "free equity" while closely monitoring and verifying project status and results. The BGFZ1 approach also focused on data and technical assistance. Other participants noted a stark contrast with other funding mechanisms for mini-grids that struggle to deliver money and achieve results because they are ultimately unable to overcome risk aversion of equity and debt providers to mini-grid operators.

The discussion began to explore more operational questions related to a possible incentive/funding mechanism for mini-grids, e.g. have there been successful post-paid RBF/subsidy models, or are examples of such models in development? What level of incentives is required to catalyse commercial activity and private investment (and what kind of investment)? The participants briefly discussed the post-paid "smart subsidy" model, which may reduce upfront costs (for proposal development, evaluation, due diligence) for commercial and development actors, and pay out per-unit (e.g. per-connection) subsidies after proof of installation and deployment (electronically monitored). Such models are being put forth in other markets, e.g. Burkina Faso, with figures ranging from USD 400-600 per connection having been considered, but participants were not aware of any advanced programmes and/or potential lessons learned.

The commercial actors (mini-grid developers and similar) pointed out some key risks that held back investment in mini-grids in rural Zambia, particularly the country's low population density, which leads to very scattered load centres and complicates grid design and economics. There are geographic areas in which small to medium sized mini-grids make economic sense; however more work needs to be done on understanding the least cost in these areas, and much better data is needed on customers' ability to pay and productive demand. There are also significant barriers to scale in navigating land-use issues for commercial actors.

Representatives of local financial sector actor(s) noted the limitations of local lending and the typical requirements for collateral, noting that the BGFZ 1 approach would be viewed very positively by financial institutions for a number of reasons, including a "third party/expert" verification of company eligibility, project evaluation, and due diligence findings, in addition to the provision of equity-like capital at an early stage to create stronger balance sheets in early stage companies. They also noted that, in absence of large capital commitments to companies, an eligibility check together with some degree of guarantee or preferential payment (e.g. in a smart subsidy if a portion of the smart subsidy was directly paid to the lender in hard currency).

KEY RECOMMENDATIONS FOR BGFA

- BGFA should carefully consider the lifetime value of mini-grid connections as they compare to other forms of power provision (e.g. on-grid or SHS) in the development of an incentive mechanism.
- Mini-grid projects should be considered in a separate "window" or evaluation parameters from those projects focusing on distribution of standalone SHS.
- Assess the strengths and weaknesses of the BGFZ "free-equity" financing approach vs. the post-paid "smart subsidy" approach, and if possible include two windows: a BGFZ 1- type window for immature companies requiring more flexible financing structures to allow early investment, and a "smart subsidy" window open to established and more mature companies. These windows could even be staged/combined along the lines of "start-up/scale-up" approach of BGFZ 1.
- Consider establishing a credit guarantee mechanism, where a channel to the private sector could be created to deliver on their targets.
- BGFA should enlist government support to the extent possible in supporting commercial actors in securing land use agreements.
- BGFA should work closely with government to ensure that various programmes are operating in harmony, and in line with electrification planning.
- The participants stressed the importance of establishing quality standards for mini-grids.

3.1.5 THEME 4: COORDINATION BETWEEN PUBLIC AND PRIVATE SECTORS AND AVOIDING DUPLICATION OF EFFORTS

KEY OUTCOMES, ISSUES AND CONCERNS

The complementary role of the private sector to the electrification efforts of the public sector was acknowledged in the group. However, the private sector faces challenges when it comes to accessing information related to rural electrification. Currently there is no procedural framework in place (one stop shop) for information that developers need.

There is no clear definition of access to energy in Zambia, making it difficult to determine the access rates at the national level. Furthermore, the regulatory framework for mini-grids is a new concept that most developers still need to familiarise themselves with.

The group also noted that the Government of Zambia is not providing clear enough guidance to the donors with regards to specific areas that need to support for rural electrification. This has contributed to duplication of efforts by the projects supported by the donors. The group further emphasized the need for the public sector to establish an enabling environment that allows for subsidies for public and private firms. Participants raised concerns with regards to the sustainability of the PPP model currently implemented by REA, considering the growing demand for mini-grids.

The group noted that the lack of coordination between public institutions and the private sector would expose the private sector to high risks related to grid encroachment. The group also noted the high cost of land acquisition for mini-grids. This raises the cost of providing electricity services to the consumers.

The group also discussed that ESAP could be seen as a means to reduce conflicting priorities between REA and the private sector as it provides capacity building and helps facilitate an interface between public and private sector.

KEY RECOMMENDATIONS FOR BGFA

- Facilitate strengthening of the engagement between private and public sector. The Off-grid Energy Taskforce could be helpful in this regard.
- Government should see the private sector as partners and not competitors.
- There is a need for support an improved coordination between the public and private sectors in monitoring and verification of access to energy in Zambia.
- Support the establishment of a body to coordinate data collection, especially from donors in order to avoid duplication of efforts.
- There is a need for gender-sensitive projects for both men and women (for example, improved cooking)
- The private sector should engage both men and women in the entire value chain
- There is a need to engage more with district leadership to create an enabling environment for land acquisition by the private sector.
- Developers should consult with REA and other relevant government departments on acquiring land rights (currently no framework exists, however IAEREP is addressing this issue by streamlining the processes required).
- Develop a clear definition of access to energy.

3.2 SOLAR HOME SYSTEMS (SHS) WORKSHOP 18 SEPTEMBER 2019

3.2.1 SOLAR HOME SYSTEMS MARKET OVERVIEW

The USAID-funded Southern Africa Energy Programme (SAEP) presented the results of a nationwide survey of current and potential future SHS consumers. The survey sought to assess (1) current expenditure patterns, particularly spending on energy, to determine whether households would be able to afford an SHS product; (2) mobile phone penetration and uptake of digital financial services and (3) awareness of SHS and current purchasing patterns and barriers to SHS take-up. In the context of BGFA, SAEP specifically presented options of how affordability of SHS can be improved for the 65 to82% of Zambians that currently cannot afford SHS. The presentation also outlined the current market landscape in terms of potential for productive use and indicated opportunities for coordination of the public and private sector in the SHS space (Please see presentation in Annex 9).

3.2.2 THEME 1: INCENTIVE MODELS THAT CAN FACILITATE PRIVATE SECTOR ENERGY PROVISION IN DEEP RURAL AREAS. DETERMINING THE RIGHT INCENTIVE LEVEL FOR SHS PROVIDERS AND HOW IT SHOULD BE TARGETED AND DEPLOYED.

KEY OUTCOMES, ISSUES AND CONCERNS

SHS providers in the group indicated that rural areas constitute the main market for their products and services. Customer portfolios in urban and peri-urban areas tend to have high default rates, due to higher mobility of customers and alternative electrification services available in these areas.

The affordability of SHS was indicated as one of the biggest challenges for SHS companies serving rural customers; SHS providers estimated that only 50 to 70% of rural households can afford an SHS (note that this is a much higher estimate than the SAEP number of 18 to 35%).. This challenge appears to be exacerbated by current developments in Zambia including macroeconomic trends, droughts and food insecurity. Besides affordability, customer access to finance, the efficient distribution of SHS, management of agent networks and customer payments were discussed as key challenges, particularly for SHS companies entering rural markets.

The group also discussed the potential benefits, impacts and risks of incentivizing local manufacturing of SHS in Zambia, the implementation of social transfer programs to bridge the affordability gap (e.g. by voucher transfers to low-income families) and aspects of sustainability related to incentive schemes reducing the affordability gap in low income rural areas. The group also identified the low quality of some products currently on the market as an additional obstacle for market development.

KEY RECOMMENDATIONS FOR BGFA

- Base the definition of “rural areas” on aspects of accessibility of areas for SHS companies; data and definitions from the Central Statistical Office (CSO) of Zambia should be taken into account.
- Consider providing SHS providers with an incentive per sale in low-income areas.
- Improved digitalization and integration of IT systems could help SHS companies to become more efficient and cost-effective. SHS system and service distribution, agent

network management and digital finance could be more automated in rural SHS markets in Zambia.
- SHS companies (specifically smaller ones) might need support in engaging with mobile telecommunications operators for mobile money payments.
- Consider credit default guarantees to address the default risk – this was noted as specifically helpful for smaller SHS companies.
- Incorporate waste management strategies in the quality assurance process of the BGFA programme.

3.2.3 THEME 2: HOW TO INCENTIVISE PRODUCTIVE USE.

KEY OUTCOMES, ISSUES AND CONCERNS

The group discussed potential ways to define "productive use" in the context of a second financing round in Zambia. BGFZ 1 used an expansive definition for "productive" based on whether an energy service customer was using the energy service to directly or indirectly enhance their ability to generate income. Although this definition was generally agreed upon to be useful, it was also seen as (1) difficult to monitor and measure and (2) not focused enough on "real productivity".

The group also discussed indirect "productive" benefits of low-tier energy services such as lighting. While the availability of light reduces crime, increases work time, and generally provides significant benefits, the base SHS unit was not viewed as income-generating. Productive use was not seen by the majority of participants to be equated with better education and improved health, although there was no universal agreement on this point.

It was noted that a key goal of rural productive use of energy would be to retain more of the value of agricultural outputs locally – i.e. retaining more stages of a given "value chain" in a given locality rather than lose value to actors located elsewhere. A key aspect of facilitating income generation in rural communities could be to increase the flow of money inside a village and to do more locally. For example, if farm produce is to be sent to a town, increasing local preparation and reducing logistics costs are perceived as important areas of productive use. Other areas for productive use include replacing inefficient and/or "dirty" energy – i.e. manual labour and drudgery in water transport and crop treatment, or diesel-powered energy in pumping.

The group endeavoured to focus the discussion around market segments with high potential benefits from improved energy services, and addressed:

- Crop value chains: Irrigating, spraying, harvesting, drying, grinding, milling, pressing, etc.
- Dairy chilling: reduce the cost of transport, reduce time between milking and chilling, reduce losses and improve yields.
- Fish chilling/drying: reduce transport costs, create export products, reduce waste, etc.
- Solar refrigeration for retail (shops) and other uses

The group highlighted the risks of productive-use programs in off-grid areas, noting primarily the lack of formal economic activity and predictable (or regular) liquidity. Even models with

short pay-back periods on investment are at risk from cash flow disruptions and the lack of market access for off-takers.

Diesel replacement was presented as a lower-risk option given it is a direct replacement of an existing energy source; however it was seen as requiring significant capacity building in rural Zambia.

The participants were concerned that the population showed increasing scepticism towards solar equipment, as there is a substantial amount of "junk equipment" on the market in Zambia. The market does not have as much faith in solar as assumed.

As ancillary support, group members indicated that substantial capacity building efforts would be needed to improve local technical capacity for system assembly and maintenance.

Funding "productive use" equipment is complex and not easily tied to the funding of electricity generating equipment. Ultimately, a move away from concessionary finance will be required, which will mean working with banks. In order to get them on board, development banks will need to see viable business models.

Mobility issues (distance to markets) need to be addressed to get agricultural products to market, e.g. by promoting/incentivising e-bikes and charging infrastructure.

KEY RECOMMENDATIONS FOR BGFA

- Establish a clear definition of productive use vs value addition vs income generation, and ensure adequate weighting of energy services of different levels and with different economic development potentials.
- Consider changing the weighting to favour "high end" uses.
- Create a working relationship between donors and (development) banks.
- Consider an RBF subsidy based on kW installed.
- Understand which agricultural subsectors (agri-food processing; fish cooling, dairy, etc.) are currently operating in financially sustainable manner and focus an incentive mechanism accordingly.

3.2.4 THEME 3: DEEPENING THE VALUE CHAIN – GENDER AND DISTRIBUTION NETWORKS; HOW TO ENGAGE/INVOLVE LOCAL PLAYERS.

KEY OUTCOMES, ISSUES AND CONCERNS

The group discussed the definition of "local companies". Some group members had the opinion that a company is local if it registered in Zambia. Others felt that the ownership of the company would need to be Zambian in order for it to be classified as local.

The group noted that it is difficult for companies to find information about opportunities for grant and other financing. In addition, applying to funding opportunities was seen as generally challenging, as submission processes tend to be demanding and complicated – local companies do not have the resources and time to write proposals. Hiring consultants for proposal development is very expensive and a big risk as calls for proposals are highly competitive and there is no guarantee of success. Eligibility requirements are also often set in a way that excludes local companies which are often smaller, earlier stage and not as well-financed as international competitors. Local companies in general would need specific support to help them understand

proposal requirements better. It was noted that both fund managers and local business communities could take a more active role in engaging with each other and sharing views and insights. This engagement could include facilitation of partnership development between local and international players but also among local companies themselves.

The group also discussed ways to support opportunities for women in the off-grid energy sector. It was noted that, should the programme intend to support women entrepreneurs, it would be important to define the term "women-led company" in more detail. What share of leaders in a company would need to be women? Furthermore, it was discussed that BGFA would need to be explicit about the ways it intends to support gender equality throughout the value chain and whether this intention takes the form of requirements or incentives. It could be addressed through direct requirements for gender ratios and policies in terms of ownership, management team and policies, or the programme could employ softer incentivizing, monitoring and supportive measures, such as identifying opportunities to empower female employees or customers, drafting gender policies and requiring the companies to report gender differentiated data on key metrics. The group also debated the importance of technical skills and their impact on the employability of women in e.g. sales of SHS.

KEY RECOMMENDATIONS FOR BGFA

- Establish a common information hub with other donors where information about grants and other financing opportunities can be found.
- Facilitate access to local finance.
- Facilitate partnerships with local and international companies.
- Facilitate partnerships and information exchange between local companies – e.g. through the Solar Industry Association of Zambia (SIAZ).
- Use eligibility criteria that do not rule out smaller or relatively new companies.
- Arrange mentoring for local players.
- Require registration of a Zambian entity.
- Set a requirement on a certain percentage of Zambian ownership after a specified period of time or by the end of the contract.
- Organise dedicated information events to provide targeted guidance to applicants on the submission requirements and more specific expectations.
- Simplify application processes.
- Note the need to find a balance between contracting large international companies with good track record sand diversifying the portfolio and options in the market.
- Provide small companies with assistance to gain support from third parties for success fee-based proposal writing.
- Have more confidence in local player's ability to deliver.
- Incentivize, support or arrange training for women in order to improve gender ratios.
- Provide training tools for customers and agents in order to improve technical understanding of the products.
- Set goals for the companies for reaching a certain share of women customers or a certain gender ratio among employees.

3.2.5 THEME 4: HOW TO ENSURE COORDINATION BETWEEN PUBLIC AND PRIVATE SECTOR AND AVOID DUPLICATION OF EFFORTS.

KEY OUTCOMES, ISSUES AND CONCERNS

As a general concern the participants stressed that coordination between the public and private sector is often hindered by "red tape".

Some gaps in regulation and enforcement of technology standards were discussed in the group. As an example, it was noted that there is no clear regulatory framework with regards to solar installations in the country. Quality management of imported solar equipment in Zambia is poor and the Zambian Bureau of Standards (ZABS) has little capacity to impose standards.

The group also noted the lack of information on the availability of local financing for renewable energy projects. Private sector actors were acknowledged by public sector entities as a hub of expertise and market information and institutions like the Solar Industry Association can play a critical role in coordination between the public and private sectors.

KEY RECOMMENDATIONS FOR BGFA

- Consider organising awareness meetings and capacity building for local financial institutions to increase their understanding of renewable energy and specifically off-grid solutions.
- Refer to GIS models by the World Bank and USAID in regards to planning of improved access to electricity in rural and peri-urban areas in Zambia.
- The Renewable Energy Association could be re-organized to encompass all types of clean energy projects (in addition to solar energy).
- Enhance coordination between the public and the private sectors for the monitoring and verification of the quality of solar equipment imported to Zambia.
- Government should set up a one stop shop for private sector clean energy projects.
- Promote the role of the REA in coordinating rural electrification.
- Use the Solar Industry Association to gather information on rural electrification from the private sector.
- Establish a clear definition of energy access in Zambia.
- The Ministry of Energy should take up the role of monitoring and verification of access to energy (SHS database).

3.3 BIOENERGY WORKSHOP 19 SEPTEMBER 2019

3.3.1 BIONERGY MARKET OVEVIEW

The presentation on the market overview of the bioenergy sector was made by the Ministry of Energy (MoE). The Ministry indicated that bioenergy contributes over 70 percent of the total national energy demand (mostly through traditional energy sources like firewood and charcoal). In the context of the relevant policy framework for bioenergy, reference was made to the government development strategy, the Vision 2030, and the Seventh National Development Plan (7NDP). It was indicated that the Vision 2030 aims to achieve universal access to clean, reliable and affordable energy at the lowest total economic, social and environmental cost. The presentation also highlighted the ongoing initiatives supporting the development of the bioenergy market in Zambia. This included the SE4ALL Access to Clean Cooking Projects, Scaling-up

Renewable Energy Programmes (SREP), the Electricity Service Access Project (ESAP), the Energy for Agriculture Project and the Bioenergy and Food Security (BEFS) Assessments. Concluding the presentation, the Ministry indicated that successful implementation of the bioenergy investment pipeline will require close collaboration with cooperating partners and the private sector for financial and technical support. The Ministry expressed confidence that BGFA will contribute towards the attainment of national targets as well as provide an opportunity for increased private sector contributions to the goal of delivering sustainable energy services to all Zambians (please see presentation in Annex 10)

3.3.2 THEME 1: PROMISING BUSINESS MODELS FOR BIOENERGY (EE COOK STOVES AND HOUSEHOLD LEVEL BIOGAS) - HOW TO PACKAGE PRODUCT OFFERINGS AS A SERVICE

KEY OUTCOMES, ISSUES AND CONCERNS

The group identified four different technologies on which the private sector members of the group built their business models in Zambia: standardised prefabricated bio-digesters for household and agricultural use, customised dome model bio-digester solutions mainly for communal or commercial use, commercial scale biogas production combined with downstream distribution in compressed biogas bottles; and efficient cook stoves. The company representatives in this group all reported similar opportunities and barriers to scale. They each identified rural communities as their primary market, mainly due to the availability of feedstock. However, customers' ability to pay is much higher in urban and peri-urban areas, and the cost of addressing rural markets is significantly higher for companies. Affordability is also affected by the fact that PAYG services for stoves in general (biogas or other fuels) are not yet offered by many of the companies. Even with PAYG integration, the high capital requirements of such a business model is a barrier as finance, especially for biogas solutions, is difficult to obtain. The sector in general still needs start-up investment. In addition, it was noted that the 3- to 4-year timeline tied to the results based finance for getting to scale is difficult to stick to for biogas; therefore, longer project durations should be considered. Increased awareness of biogas solutions and generating energy from waste was seen as a promising way to facilitate broader adoption of the technologies. Both biogas solutions and cook stoves with alternative fuels face a cultural barrier as people prefer to cook using charcoal. Even households that do use LPG usually also still use traditional stoves or an open fire. For biogas solutions, the high cost of cooking appliances for biogas was identified as an additional barrier for customers. The opportunity to incentivise the use of efficient charcoal was discussed and it was agreed that while it likely has a lower barrier for adoption compared to other cooking fuels it should be considered only as an intermediary solution (stepping stone) and not a longer term solution.

KEY RECOMMENDATIONS FOR BGFA

- The bioenergy related opportunities lie mainly in heating and cooking. Electricity generation is not competitive with solar but could work as an ancillary solution.
- The sector at large is in an early stage and still needs start-up capital
- Support is required in increasing awareness and policy development
- Better understanding required of the entire value chain as well as the different customer segments in order to properly design ways to incentivize the sector
- Consider incentivizing appliances used for biogas solutions
- Consider up-front financing for set up and implement PAYG models

3.3.3 THEME 2: ROLE OF THE PUBLIC SECTOR; NEED FOR REGULATION, AWARENESS RAISING AND CAPACITY BUILDING

KEY OUTCOMES, ISSUES AND CONCERNS

This discussion group noted that the bioenergy sub-sector is highly unregulated and the market for modern use of biomass is underdeveloped in Zambia. A few standards have been developed but these are not enforced. It was further noted that awareness of modern biomass use is low, as the private sector considers the implementation of awareness raising activities to be very expensive. The Department of Energy has only limited resources available for awareness raising activities - e.g. some billboards that were put up in 2006 still carry the same message.

It was agreed that there was a need for concerted efforts by the private and public sectors to raise awareness through e.g. annual joint events (such as energy week, agricultural shows).

The lack of enforcement of forestry regulations on charcoal production and transportation has resulted in charcoal being cheaper than alternatives. The group also noted the lack of regulation related to non-efficient cook stoves. This has affected the development of the market for efficient cook stoves as non-efficient stoves are far cheaper. However, standards for efficient cook stoves should not be too ambitious as this could have an effect on the end price of the stoves and hence inhibit the growth of the market. High health standards should be maintained. Further, the newly proposed sales tax was seen as a potential barrier to the development of the market for efficient stoves.

KEY RECOMMENDATIONS FOR BGFA

- Facilitate increased cooperation between public and private sector for awareness-raising activities.
- Consider including a budget for awareness raising and capacity building.
- Allocate more government resources to the Department of Energy for awareness-raising activities.
- Facilitate the development of capacity for accounting and data collection for project developers to be able to interface with BGFA verification systems.
- Build capacity of local financiers to understand the renewable energy sector (especially off-grid solutions) as a way of lower perceived risks by the financial institutions.
- Establish a standards body for cook stoves to check efficiency and ensure there is a regulation body to check and implement standards.
- Strictly enforce regulations on charcoal production and transportation.
- Consider funding demonstration projects for biogas solutions.
- Apply the same regulations as those for solar mini-grids to biomass, rather than developing new regulations from scratch.
- Develop health regulations on carbon monoxide emissions from biomass projects.
- Consider capacity building of regulators and implementers of biomass technologies.

3.3.4 THEME 3: THE PREFERRED INCENTIVE MECHANISM FOR THE BIOENERGY SECTOR AND HOW IT CAN BE TARGETED AND DEPLOYED; WHAT ARE THE POTENTIAL LINKS TO CARBON FINANCE?

KEY OUTCOMES, ISSUES AND CONCERNS

At the beginning of the group discussion, two energy service companies described their service offers. The company sells improved cook stoves in urban and peri-urban areas, promoting a fuel

switch from charcoal to pellets. The improved cook stove (ICS) technology it uses is advanced compared to currently available technology in Zambia (basically, Mbaula cook stoves); using the promoted technology, customers would need 300 kg of wood pellets per year for cooking instead of 1 tonne of charcoal (equal to around 6 tonnes of wood) per year using a traditional cook stove. A key challenge for the cook stove business is affordability of cook stoves for customers. When PAYG technology is used, customers can spread the investment over a longer period. However, PAYG means the energy service provider needs to provide consumer finance and act like a bank. This is a difficult role to take on for early-stage SMEs in this space; access to guarantee schemes or impact finance could help SMEs to de-risk the business model.

The second company presented household biogas solutions. The company's business model is based on experiences from SHS business models; sales teams specially target women as primary customers and conduct tailored due diligence on customers before an un-securitized loan is provided by the energy service provider to the customer. The model was tested in Zambia based on a 2-stage incentive scheme (incentives were provided to the energy service company at the time the contract with the customer was signed and once the company could prove that the customer was using the stove).

During the group discussion, participants highlighted the importance of promoting improved cooking solutions and raising awareness at community level, and discussed the high-carbon and development impact of ICS projects and business models. The group further debated the opportunity to involve MFIs and Development Banks, specifically in the context of PAYG asset financing and credit scoring of customer portfolios; as well as the potential opportunity to include businesses and institutions as anchor clients in ICS business models. The availability of collateral is a challenge even with a performing portfolio. Adaptation to climate change could be kept in mind; Zambia is facing adaptation-related challenges (e.g. low water levels in main dams leading to power interruptions).

RECOMMENDATIONS FOR BGFA

- Consider guarantee schemes as security for consumer debt.
- Support awareness raising and promotion of improved bioenergy systems.
- Establish working relationships with MFIs and Development Banks (e.g. DBZ) to help meet working capital requirements and financing of customer portfolios at discounted rates (specifically in the context of PAYG asset financing).
- Bioenergy activities should utilize lessons learned from solar PAYG business.
- Review regulations in order to support provision of services to beneficiaries (not technology as such).

3.3.5 THEME 4: POTENTIAL TO USE BIOMASS AND BIOGAS FOR ELECTRICITY GENERATION FOR MINI-GRIDS

ISSUES AND CONCERNS DISCUSSED IN THE GROUP

The original focus of this breakout group was bioenergy for mini-grids; however, this was expanded to include other forms of productive applications of bioenergy beyond mini-grids, so as to not exclude discussions of extant models in the country.

The group discussed opportunities in the Zambian market for bioenergy to power productive applications and mini-grids. The general consensus was that nearly all cases for electricity

production via bioenergy are part of a hybrid approach – e.g. solar/biomass hybrid, wherein the role of biofuel is as a stabilizing and/or backup source of generation, particularly when 24 hr electricity is required.

There are bioenergy opportunities in Zambia, in particular for the agricultural sector; i.e. for livestock farmers with significant numbers of animals. Although the financial case for bioenergy in agriculture is not always strong, participants felt that demand will continue to rise as grid power becomes more unreliable.

The group noted that there are challenges in bringing small-scale bioenergy solutions to scale in Zambia given the constrained economic conditions in farming communities, with a significant number of farmers unable to consistently maintain sufficient feedstock to render such solutions financially viable and/or sustainable over the longer term.

For wood-powered biomass generation, there is significant need in the forestry sector for consistency and general improvements in forest management – deforestation was not thought by participants to be considered a very high priority at any level of government.

The group also agreed that the limitations of bioenergy are related more to the business and economic side than the technological side – "the technology is there, it is the business models that are missing," said one participant.

The group deliberated incentives for bioenergy, and specifically discussed what types of incentives would be sensible given the perceived limits to scale of single-technology solutions. One option was to focus on models that offer an incentive to both an anchor client – e.g. a large farm or farming community, which could provide feedstock and make up the bulk of demand; and to a separate mini-grid operator, which would purchase the power from the farmer and re-sell it to residential and commercial clients. The participants felt that it would not make sense for one entity to be responsible for both – i.e. "farmers should not be entering the energy service to households business" – but rather BGF should incentivize cooperation between farmers-producers and mini-grid operators.

RECOMMENDATIONS FOR BGFA

- Generate more knowledge of bioenergy business models by supporting a "pilot" model with a pathway to scale, and focus on generating data and information in the process, given the very nascent stage of the market and lack of broad understanding of the potential.
- Incentivize "joint" approaches in which energy service companies operating mini-grids work together with bioenergy generation "anchor" clients to test hybrid approaches.
- Incentivize last mile connections.

4 CONCLUSIONS AND NEXT STEPS

Key recommendations regarding all three sectors (Mini-grids, Solar Home Systems Bioenergy), resulting from the formal presentations in the plenary sessions as well as the group discussions, were related to the importance of coordination, the need for improved access to finance and information, improved regulatory frameworks, increased awareness and tailored incentives for further development of the off- grid energy market. There was a consensus among the participants that affordability was one of the biggest challenges in market development specifically in rural

off-grid areas. Further, participants highlighted the lack of a clear definition of access to electricity.

The inputs and recommendations gathered from participants during the workshop will feed into the design of the second funding round in Zambia. However, some of the recommendations made by the workshop participants fell outside the scope of the planned BGFA funding window. These recommendations will be considered by the BGFA team in the context of stakeholder coordination and engagement, specifically in the context of the Off-Grid Task Force.

ANNEX 1: WORKSHOP AGENDA

Agenda for Private sector stakeholder consultation workshop
Tuesday, 17th -19th September 2019

17 SEPTEMBER **BEYOND THE GRID FUND AFRICA (BGFA) – ZAMBIA OPENING**	
8:30 – 9:00	**Registration**
9:00 – 9:30	**Welcome and Key Note Addresses** - *Swedish Embassy* - *KfW* - *Ministry of Energy – Minister of Energy , Hon. Matthew Nkuwa (**Key Note Speech**)*
9:30 – 10:00	**Objectives of the Workshop and an Overview of the Beyond the Grid Fund for Africa (BGFA)** REEEP - Objectives and expected outcomes of the workshop - Introduction – Beyond the Grid Fund for Africa (BGFA)
10:00 – 10:45	**Setting the Scene** - Positional statement from DOE – Policies supporting private sector participation in rural electrisation (envisaged policy direction for rural electrification) - Positional statement from Rural Electrification Agency – REA's Off-grid initiatives to accelerate rural electrification in Zambia - Positional statement from Energy Regulation Board – off-grid regulatory framework for Zambia - Q&A session
10:45 – 11:10	**Coffee**
MINI-GRID SECTOR WORKSHOP	
11:10 – 11:25	**Icebreaking Session -** - Introduction of the participants
11:25 – 10:45	**Mini-grid Market Overview** - Challenges, issues, and opportunities – REA - Including Land rights, site selection, local permits, regulation and tariffs - Available funding in the off-grids (mini-grids) space and the existing gaps that can be field by BGFA- Zambia (how BGFA can interface with other ongoing initiative)
11:45 – 12:00	**Overview of Group Discussion and formation of Groups** - **Theme 1:** How to define the energy service and service levels? How to incorporate other aspects of the service (appliances, energy efficiency, - **Theme 2:** How to incentivise productive use? What is the role of mini-grid operators in driving the "productive" marketplace?

	- **Theme 3:** What is the right incentive level and how should it be targeted and deployed? How should it be monitored, and tracking which KPIs (technical, financial, environmental/social)? - **Theme 4:** How to ensure coordination between public and private sector and avoid overlap Formation of breakaway groups**.**
12:00 – 13:00	**Break-Out Sessions** - Each Theme is discussed by participants in small groups.
13:00 – 14:15	**Lunch and Networking**
14:15 – 15:15	**Continuation of Break-Out Sessions** - Each theme is discussed by participants in small groups
15.15 – 16:00	**Report back from Break-Out Sessions** Moderated by Yorum Ngosa Mbolela / REA - Each Group reports back on its discussions, findings and recommendations in max. 10 minute summaries (ppt.) - General Discussion / comments on each of the findings
16:00 – 16:30	**Wrap up and Summary** (moderated by REEEP; TBD) - Summary of key recommendations and findings of the discussion groups - Next Steps for Fund & Procurement - Close of Workshop
18 SEPTEMBER **SOLAR HOME SYSTEMS WORKSHOP**	
8:30 – 9:00	**Registration**
9:00 – 9:20	**Welcome, introduction to BGFA and review of objectives-** NEFCO / REEEP
9:20 – 9:35	**Ice breaker session**
09:35- 10:00	**SHS market overview** - Affordability **of SHS in rural Ares in Zambia- SAEP**
10:00 - 10:15	**Overview of Group Discussion and formation of Groups** - **Theme 1:** What are the incentive models to penetrate deep rural areas? What is the right incentive level and how should it be targeted and deployed? - **Theme 2:** How to incentivise productive use? - **Theme 3:** Deepening the value chain – gender and distribution networks; how to engage/involve local players? - **Theme 4:** How to ensure coordination between public and private sector and avoid overlap? Formation of 4 break away groups
10:15 – 10:40	**Coffee break**

10:40- 12:30	**Break-Out Sessions** - Each Theme is discussed by participants in small groups
12:30 - 13:30	**Lunch and Networking**
13:30 – 14:30	**Continuation of Break-Out Sessions** - Each Theme is discussed by participants in small groups
14:30 – 15:15	**Report back from Break-Out Sessions** moderated by **REA -** - Each Group reports back on its discussions, findings and recommendations in max. 10 minute summaries (ppt.) - General Discussion / comments on each of the findings
15:15 – 16:00	**Wrap up and Summary** moderated by TBD - Summary of key recommendations and findings of the Discussion Groups - Next Steps for Fund & Procurement - Close of Workshop
19 SEPTEMBER **BIOENERGY WORKSHOP**	
08:30-09:00	**Registration**
9:00 – 9:20	**Welcome, introduction and review of objectives** REEEP / NEFCO
9:20 – 9:35	**Ice breaker session**
09:35 - 10:00	**Bioenergy in Zambia, Current and Pipeline initiatives – DOE**
10:00 - 10:15	**Overview of Group Discussion and formation of Groups** - **Theme 1:** Promising business models for bioenergy (EE cook stoves and HH level biogas); how to package product offerings as a service? - **Theme 2:** Role of the public sector; need for regulation, awareness raising and capacity building - **Theme 3:** What is the preferred incentive mechanism, how can it be targeted and deployed; link to carbon finance? - **Theme 4:** Potential to use biomass and biogas for electricity generation for Mini-grids.
10:15 – 10:40	**Coffee break**
10:40 - 12:30	**Break-Out Sessions** - Each Theme is discussed by participants in small groups
12:30 - 13:30	**Lunch and Networking**
13:30 – 14:30	**Continuation of Break-Out Sessions** - Each Theme is discussed by participants in small groups

14:30 – 14:15	**Report back from Break-Out Sessions** Moderated by **DOE -** - Each Group reports back on its discussions, findings and recommendations in max. 10 minute summaries (ppt.) General Discussion / comments on each of the findings
15:15- 16:00	**Wrap up and Summary** - Summary of key recommendations and findings of the Discussion Groups - Next Steps for Fund & Procurement Close of Workshop
END OF PROGRAMME	

ANNEX 2: PRESENTATION OF THE BEYOND THE GRID FUND AFRICA BGFA

Accessible on the Beyond the Grid Fund Africa website:
https://beyondthegridfund.africa/2019/10/07/stakeholder-workshops-lusaka/

ANNEX 3: PRESENTATION - POSITION STATEMENT FROM DEPARTMENT OF ENERGY (DOE)

Accessible on the Beyond the Grid Fund Africa website:
https://beyondthegridfund.africa/2019/10/07/stakeholder-workshops-lusaka/

ANNEX 4: PRESENTATION - POSITIONAL STATEMENT FROM RURAL ELECTRIFICATION AGENCY (REA)

Accessible on the Beyond the Grid Fund Africa website:
https://beyondthegridfund.africa/2019/10/07/stakeholder-workshops-lusaka/

ANNEX 5: PRESENTATION - POSITION STATEMENT FROM ENERGY REGULATION BOARD (ERB)

Accessible on the Beyond the Grid Fund Africa website:
https://beyondthegridfund.africa/2019/10/07/stakeholder-workshops-lusaka/

ANNEX 6: GUIDING QUESTIONS FOR THE GROUP DISCUSSIONS

MINI-GRID WORKSHOP 17 SEPTEMBER 2019

Theme 1: How to define and verify energy service and service levels? How to incorporate other aspects of the service such that it takes into consideration, among others, the different needs of men and women (appliances, energy efficiency, etc.)

- Feedback from the group on the multi-tier framework used in the first financing round in Zambia – i.e. is it useful to measure Wh, availability, quality, number of appliances? How can MTF be adapted and how can the framework be practical for broad range of mini-grid operators?
- How to define energy services / service level (beyond measuring Wh)
- How can energy efficiency developments be taken into account? How can improved levels of energy efficiency be specifically incentivized by BGFA? How can value of efficient consumption be captured by mini-grid operators without jeopardizing revenues?
- What are opportunities for prototyping blue-sky models in Zambia (e.g. vehicle2grid, smart appliances, demand response, grid interactivity, and other future-oriented applications)
- What are relevant definitions by the GRZ related to energy services and access to energy?
- Gender aspects to consider for the energy service provision? Differentiated energy services for women and men?

Theme 2: How to incentivise "productive use?"

- How should we define "productive" (in BGFZ productive = +income as a result of energy service) What productive use is relevant for Mini-Grids in Zambia? What is the level of energy demand?
- Who should be incentivized? What role do mini-grid operators play in driving "productive" demand and how does the money flow?
- What are key barriers for customers, differentiated by gender, to subscribe to energy services for productive use?
- How are Mini-Grid companies already promoting productive use of energy at the sites? Are they using different promotion strategies for women and men?
- Are there productive use activities differentiated by gender (women and men?) Is there a productive use sector that is specifically relevant for women; and constitutes a specific opportunity for the company?
- What ancillary support (other than funding) would be necessary / useful in promoting productive use

Theme 3: What is the right incentive level and how should it be targeted and deployed? How should it be monitored, and tracking which KPIs (technical, financial, environmental/social)?

- Why monitor and track KPIs?
- Improve benchmarking, financial modelling, investor confidence in MG models and ultimately shift capital to the sector
- Drive MGs as engines of innovation, prototyping and value creation for off-grid socioeconomic development.
- What the challenges in harmonizing and monitoring KPIs for deployment of mini-grid business models toward electrification?
- Economic/Business KPIs (per site CAPEX/OPEX, WACC, ARPU/ARPS, coverage ratios, IRR, LCOE, etc.)
- Technical KPIs (capacity utilization, SAIDI/SAIFI, % uptime, system losses, service level at connection, etc.)
- Social KPIs? (Productive?, health?, safety?, education?, etc.)
- Experiences from other KPI-heavy electrification programmes (e.g. WB/QAF)
- Smart meters required/nice to have? How to incentivize?
- **The Incentive**: Pre-financed RBF or SMART subsidy? Are project developers able to mobilise capital quickly in the context of a SMART subsidy? Is the pre-financed RBF still required (pre-financed activities/milestone/results-based payments) or some combination of the two?

- What other types of financing required for rapid deployment of mini-grids? E.g. concessional debt/equity, from where could this come and how could a BGF window complement other financing programmes in Zambia?
- Considerations - how must the process be structured to move the needle on deployment quickly – i.e. speed and efficiency of procurement/call for proposals, evaluation, due diligence, contracting, etc.?

Theme 4: How to ensure coordination between public and private sector and avoid overlap (including gender related interventions)

- Feedback from the group on the new mini-grid policy; first experiences after 6 months since the launch of the policy?
- Coordinated planning – potential roles for the private and public sector in planning and implementing rural electrification
- Does a concession model make sense in Zambia? How could such a model be constructed (e.g. YELEEN "integrated distribution" model?)
- Coordination in monitoring and verification of access to energy in Zambia
- Coordination for local permit processes - securing longer term land rights and streamlining local permit processes
- Information on grid extension? Interactivity/net-metering requirements?

SOLAR HOMES SYSTEMS (SHS) WORKSHOP 18 SEPTEMBER 2019

Theme 1: What are the incentive models to penetrate deep rural areas? What is the right incentive level and how should it be targeted and deployed?

- What is the opportunity for SHS companies to enter remote rural areas?
- What are barriers, challenges and risks in servicing customers in remote areas?
- How would the SHS companies define the affordability/ profitability gap?
- What are the SHS company strategies to manage risks related to servicing customers with low purchasing power/ability to pay?
- How can deep/remote rural areas be defined and monitored?
- What are incentive mechanisms that could help companies target remote rural areas and/or customer with low ability to pay?
- Who should be incentivized? How should the money flow through the program?
- How can funding be targeted to ensure that it doesn't distort the market especially vis a vis existing players and new entrants?

Theme 2: How to incentivize productive use?

- What productive use is relevant for SHS companies in Zambia? What productive use clients constitute a specific opportunity for the companies?
- Who should be incentivized? The SHS companies or the customer / end user? How should the money flow?
- What are key barriers for customers, differentiated by gender, to subscribe to energy services for productive use?
- How are SHS companies promoting productive use of energy at the sites?
- Is there a productive use sector that is specifically relevant for women; and constitutes a specific opportunity for the company?
- What ancillary support (other than funding) would be necessary / useful in promoting productive use

Theme 3: Deepening the value chain – gender and distribution networks; how to engage/involve local players? Where are women present across the value chain and as what type of actor? What would be the entry points for women across the value chain? How to increase women's participation across the value chain?

- What is the opportunity for SHS companies to work with local service providers?
- What is the specific opportunity for SHS companies in contracting women as employees and service providers?

- How could BGFA be structured to be more inclusive for local service providers across the value chain?
- What are opportunities for women's employment across the SHS value chain?
- How can women´s employment specifically be incentivized by BGFA?
- How can the inclusion of local service providers be specifically incentivized by BGFA?

Theme 4: How to ensure coordination between public and private sector and avoid overlap (including gender related interventions)? Is there any gender-specific renewable energy intervention in the sector?

- Coordinated planning – potential roles for the private and public sector in planning and implementing rural electrification
- Coordination in monitoring and verification of access to energy in Zambia
- What other ancillary support (other than funding) from the public sector would be necessary / useful in promoting SHS deployment?

BIOENERGY WORKSHOP 19 SEPTEMBER 2019

Theme 1: Promising business models for bioenergy (EE cook stoves and HH/SME level biogas); how to package product offerings as a service, such that it will meet the needs of both, women and men?

- What customer segments constitute a specific opportunity for companies (urban, rural, peri-urban / men and women)?
- What are promising product and service offerings? How do they meet the needs of women and men?
- What is the potential for scale? What are the barriers for scale?
- How can incentives be structured to help companies to get to scale?

Theme 2: Role of the public sector; need for regulation, awareness raising and capacity building

- What regulations are in place that provide opportunities for the private sector to roll out their business models?
- What are specific regulatory barriers and structural challenges in the market?
- What is the private sector / the public sector raising awareness for bioenergy solutions?
- How could BGFA contribute to awareness raising and capacity building?
- What ancillary support (other than funding) would be necessary / useful in promoting bio-energy use

Theme 3: What is the preferred incentive mechanism, how can it be targeted and deployed; link to carbon finance?

- Who should be incentivized? The bioenergy companies or the customer / end user? How should the money flow?
- What are key barriers for customers, differentiated by gender, to subscribe to bioenergy services?
- Is there a productive use sector that is specifically relevant for women; and constitutes a specific opportunity for the company?

Theme 4: Potential to use biomass and biogas for electricity generation for Mini-grids

- What customer segments constitute a specific opportunity for companies (urban, rural, peri-urban / men and women)?
- What are promising product and service offerings? Do they meet the needs of both, women and men?
- What is the potential for scale? What are the barriers for scale?
- How can incentives be structured to help companies to get to scale?

ANNEX 7: WORKSHOP ATTENDANCE LIST

BGFA Opening and mini-grid workshop 17 September 2019	
Total number of participants	119 participants
Institutions represented	
SOLIDARMED	
World Bank	
EML	
SolarAid	
NECOS	
REA	
GET invest	
DBZ	
ERB	
ADVANCE	
SNV	
ERB	
DOE	
Solena	
SOUTHHILLS ENT.	
RICHWIMSOLAR	
Green Envirowatch	
GET FIT ZAMBIA	
CSK Zambia	
Longzi University	
Daily Mail	
USAID	
JAEP	
Soldiar Med	
IAEREP	
SFM RADIO	
ZNBC	
MUVI TV	
Hot FM	
Prime TV	
Money FM	
Phoenix FM	
Radio Christian Voice	
CBCTV	
A.F.D france	
Ashfield Resources	
Ashfield	
ZCCN	
Millenium Radio	
En-code	
NEW AFRICA POWER	
Small Hydro	
Tenaten/innovations	
Freelance	
KfW	
Embassy of Sweden	
Africagreenco	

WIDEENERGY
BHL
Times of Zambia
Beats FM
Daily Nation
Komboni Radio
News Diggers
Bloomberg
MAST
KBNTV
MUVI TV
USAID
SEL
ENGIE
FICHTER
VIRUNGA POWER
SAEP
SOLAR QUEST
Muhanya Solar
ABN TV
ZAMBIA24
NEWS24
Diamond TV
Id solar
MOE
Jothanuel(Z)
ROSA SOLAR
NOXDEZGLOBAL
6th Wave Africa
ELUDITE Strategies
SMG
MPOWER
Buffalo energy
Climate mat
ERB
QTY/QFM
ZBT newspaper
Prime T. V
WCG
CITY TV
One Love Rubio
Azuri technologies
EES LTD

Solar Home Systems workshop 18 September 2019	
Total number of participants	56 participants
Institutions represented	
Topstar	
UNCDF	
Freelance	
Solar Aid	
DBZ	

EES LTD
Rent to own
Climate Management
Widenergy
Fenix Int
Onyx
USAID/SAEP
Vitalite
EML
Supamoto
Green Enviro
CSR Zambia
Green Enviro
Solar village
Ricwim solar
Southhills enterprises
Get Invest
Enfinity
USAID
REA
Littleson
Mpower
ERB
Azuri
Namene Solar light company
Rosoi solar
Tenaten Inv
Africa Green Co
Solar quest
Thomro Biofuels
EU

Bioenergy workshop 19 September 2019	
Total number of participants	44 participants
Tenaten Innovations	
DBZ	
EES	
Climate management	
GEW	
CSR Zambia	
Buffalo Energy	
GIZ	
Advance	
SNV	
CIG Zambia	
Supamoto	
Solarquest	
ZENGO	
Engie	
REA	
Embassy of Sweden	
Jothanuel (Z)	
Southhills Ent	

ZCCN
GEW
Enfinity
ERB
DOE
NECOS
Freelance
Ecogas
Engineer
ND Power
SAEP
EML
REA
ZHAP
CEEEZ
GET invest
IAEREP
USAID

ANNEX 8: PRESENTATION ON THE MINI-GRID MARKET OVERVIEW

Accessible on the Beyond the Grid Fund Africa website:
https://beyondthegridfund.africa/2019/10/07/stakeholder-workshops-lusaka/

ANNEX 9: PRESENTATION ON THE SOLAR HOME SYSTEM MARKET OVERVIEW

Accessible on the Beyond the Grid Fund Africa website:
https://beyondthegridfund.africa/2019/10/07/stakeholder-workshops-lusaka/

ANNEX 10: PRESENTATION ON THE BIOENERGY MARKET OVERVIEW

Accessible on the Beyond the Grid Fund Africa website:
https://beyondthegridfund.africa/2019/10/07/stakeholder-workshops-lusaka/