



WWF

ENERGY
ACCESS MODEL

UG

2019

RENEWABLE ENERGY ACCESS MODEL

Compiled by Happy Ali, Ibrahim Mutebi and Edna Nyamwaka June, 2019

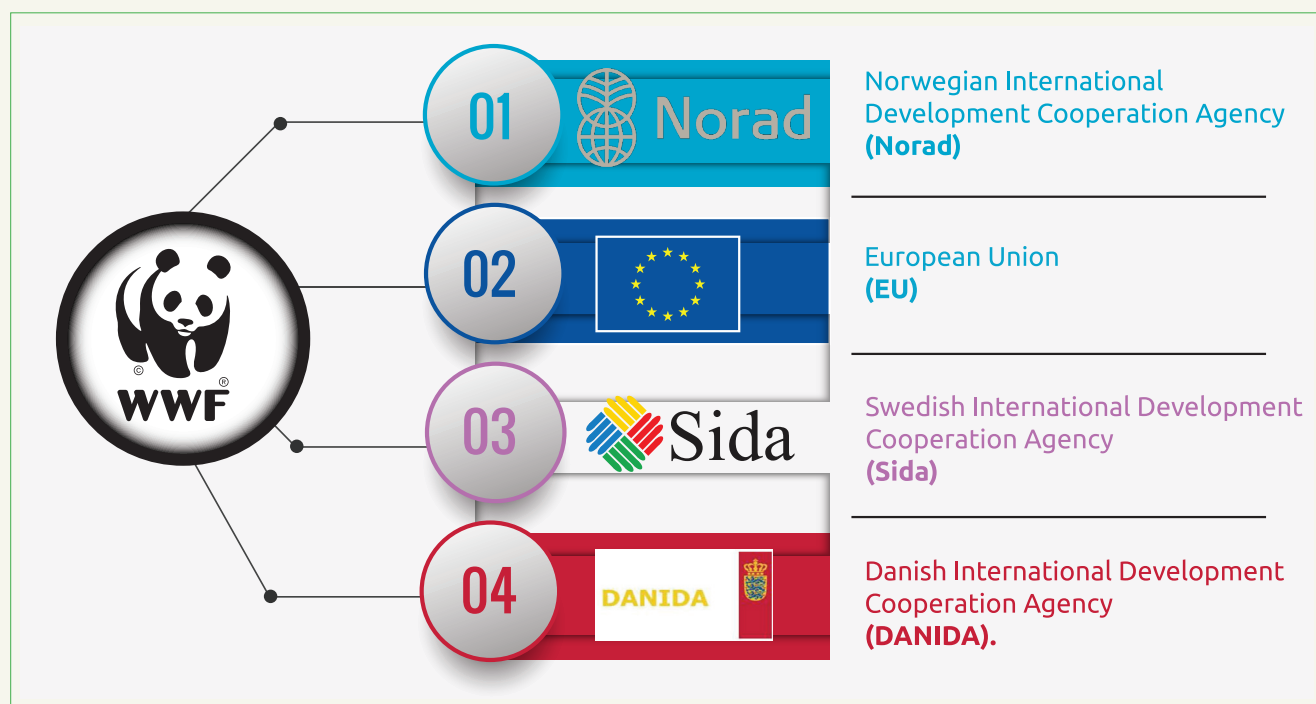
Table of Contents

1.	INTRODUCTION	3
1.1	BACKGROUND	4
2.	INNOVATIVE BUSINESS MODEL	5
2.1	APPROPRIATE & HIGH QUALITY PRODUCTS	6
2.2	EFFECTIVE & EFFICIENT DISTRIBUTION NETWORK	7
2.3	EFFECTIVE DEMAND	8
2.4	AFFORDABLE PRICE	9
2.5	CONDUCTIVE POLICY & REGULATORY ENVIRONMENT	10

1. INTRODUCTION

This documentation highlights the innovative approaches undertaken by World Wide Fund for Nature – Uganda Country Office (WWF-UCO) in partnership with government, civil society organisations (CSOs) and private sector to facilitate access to off-grid Renewable Energy Technologies (RETs) to rural households in the Albertine Rift region.

This work is funded by donors that include; Norwegian International Development Cooperation Agency (Norad), European Union (EU), Swedish International Development Cooperation Agency (Sida), and Danish International Development Cooperation Agency (Danida).



1.1 BACKGROUND

Only 28% of the population has access to electricity for lighting in Uganda and the majority of the population depend on kerosene for lighting which is associated with toxic fumes both to human health and the environment (statistical abstract MEMD, 2017) . This low access to electricity means that most rural households use kerosene lamps as well as candles and fuel wood for lighting which are not only inefficient, hazardous and expensive but they also contribute to pollution and have serious implications on health and the environment.

Even for those with access to electricity, it is expensive to use it for cooking. Hence the majority of households use wood fuel as the main source for cooking. Overall, 71% of the households use firewood while 23% use charcoal for cooking (UBOS, 2016). The heavy dependency on fuel-wood is already contributing to unsustainable use of tree biomass in Uganda which was estimated at 44 million tonnes per annum (BEST, 2013) . Moreover, of the 44 million tonnes of biomass consumed annually, the tree resource is estimated to sustainably supply only 26 million tonnes, which is well below the current demand. Biomass consumption in the country is associated with the use of the traditional three-stone stove whose efficiency is very low, at about 15% (BEST, 2013). This method of cooking is wasteful in that 75% of the heat from the firewood is dispersed in open air while it exposes the users to numerous pollutants causing health problems such as acute respiratory infections.

While off-grid renewable energy technologies have been fronted as one of the alternative solutions to bring electricity to the rural areas which are far from the national grid, the problem of high upfront costs for renewable energy technologies such as Solar PV systems and improved cook stoves is a major limitation. This is because poverty levels are high and financial products to facilitate acquisition of these technologies remain limited. Other factors known to be limiting access to these solutions include: a) limited distribution centres in off-grid communities, b) limited local technical capacity to design, install and maintain the technologies, c) limited awareness of the availability, benefits and opportunities of using the technologies, and d) Inadequacy in the enforcement and promotion of quality standards for off-grid energy solutions.

¹ Uganda Bureau of Statistics (UBOS) 2016, *The National Population and Housing Census 2014 – Main Report*, Kampala, Uganda

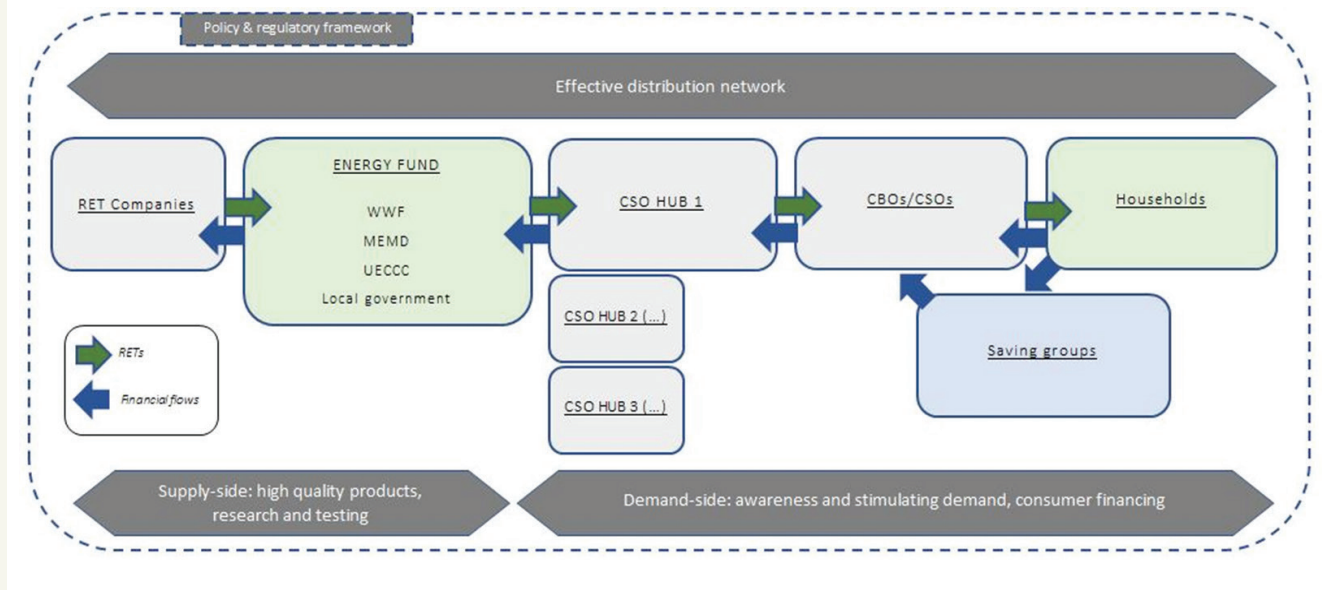
² Biomass Energy Strategy (BEST) Uganda 2013, Ministry of Energy and Mineral Development (MEMD), Kampala, Uganda,

2. INNOVATIVE RENEWABLE ENERGY ACCESS MODEL

The model in the document describes the key stakeholders and how they interact to facilitate access to RETs. This model is hinged on five key elements, which have been identified as:

- Appropriate & high quality products
- Effective & efficient distribution network
- Effective demand
- Affordable price
- Conducive policy & regulatory environment

Figure 1: The renewable energy access model captures the stakeholders involved and the flow of SHS and finances



2.1 APPROPRIATE & HIGH QUALITY PRODUCTS

It is important that the products offered meet the identified and not assumed needs of the local communities. Knowledge, Attitude and Practice (KAP) studies and monitoring visits are conducted to understand the needs and concerns of target communities. In line with the findings of studies and monitoring visits, the projects implemented by WWF-UCO offer a large product range of various sizes and types that are appropriate for the needs of the communities. These products also require minimum maintenance. They include:

Improved Cook Stoves:

- a) **Portable** - Charcoal only (Size 1, 2 & 3) and Dual (firewood and charcoal) – Size 2
- b) **Fixed** – both charcoal & firewood (Size 1, 2 & 3)

Table 1: This shows the three different types of Improved Cook stoves



Portable - Charcoal only



Dual (firewood and charcoal)



Fixed – both charcoal & firewood

Solar Home Systems

- a) **Super Panda** - powers one lamp and can charge a phone,
- b) **Super Taala** – powers four lamps and can charge a phone, and
- c) **Panda Extra** – powers six lamps, radio, TV and can charge a phone

Table 2: This shows the three different Solar PV products with varying number of lamps



Super Panda



Super Taala



Panda Extra

The solar pv products offered have Lighting Global Quality Certification and are guaranteed for one year. All lamps have Light Emitting Diode (LED), the latest lighting technology and can last up-to 10 years with batteries made of the latest technology lithium iron phosphate and this can last an average of 7 to 10 years. Panels are made of silicon crystalline cells and can perform up to 25 years without a slight depredation on performance/ output.

On the other hand, the ICS conform to the standards of thermal efficiency emissions, safety and durability in line with International Organisation for Standardization (ISO/TC 285) and the Uganda Household Biomass Stoves Standard (2019). The ICS are also guaranteed for one year.

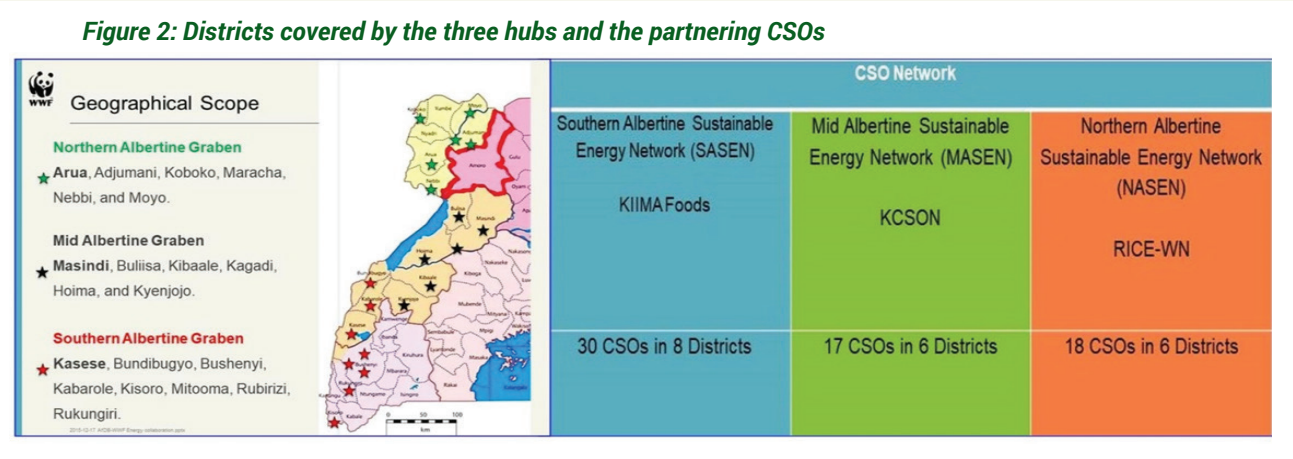
The quality of the RETs is tested at the Centre for Research in Energy and Energy Conservation (CREEC) - a research, consultancy and training organization based at Makerere University to ensure that they meet recognised performance standards.

2.2 EFFECTIVE & EFFICIENT DISTRIBUTION NETWORK

To deliver sustainable energy at scale, the quality product has to be accessible to the end-users in the target communities. WWF-UCO is facilitating linkages between RET companies and civil society organizations (CSOs) to facilitate last mile delivery of RETs. In this arrangement, the RETs companies provide the products while the CSOs deliver the products to the end-users as they are rooted in the communities, as detailed in Table 3 below.

Table 3: Linkages between CSOs and Solar PV Companies	
Solar PV Companies	<ul style="list-style-type: none">• Provide the solar home systems to the CSOs• Offer warranty and guarantee for the products
CSOs	<ul style="list-style-type: none">• Reduce entry costs to markets by acting as agents/stockists for the private sector in strategic locations in the target districts.• The CSOs earn a commission for people who they mobilize to purchase the technologies.• Deliver products & services such as installation & maintenance to communities for a fee.• With their knowledge of rural areas, the CSOs provide market intelligence to identify new markets in rural areas through reaching out to individuals and groups.• The CSOs also facilitate match-making through identifying additional potential distributors and retail partners. Some of these include: supermarkets, hardware shops, retail shops, etc.

The creation of CSO networks/hubs to coordinate the activities of civil society in the Albertine Graben provides an opportunity to expand the distribution network rapidly. This will in turn help to increase on the outlets in rural areas where RETs can be acquired by the communities. Under this project, WWF-UCO partnered with three CSOs that include Kiima Foods, Kitara Civil Society Organizations’ Network (KCSO) and Rural Initiative for Community Empowerment-West Nile (RICE-WN) to coordinate other like-minded CSOs in the Albertine Graben. *See figure 2 below;*



2.3 EFFECTIVE DEMAND

Awareness campaigns should be sustained to stimulate demand for the products. These campaigns have potential to promote general awareness and consumer education which can help to build consumer trust and generate demand for the products. WWF-UCO and partners are using various approaches to create awareness and the most effective methods have been reported to be: community demonstrations, radio and use of community-based sales agents to undertake door to door marketing. The community meetings and door to door marketing allow for direct interaction with the target groups which helps to build trust and also enable communities to verify for themselves the benefits through product demonstrations.



Figure 3: Staff from CREAM demonstrating to the members of the community group on how to use the improved cook stoves

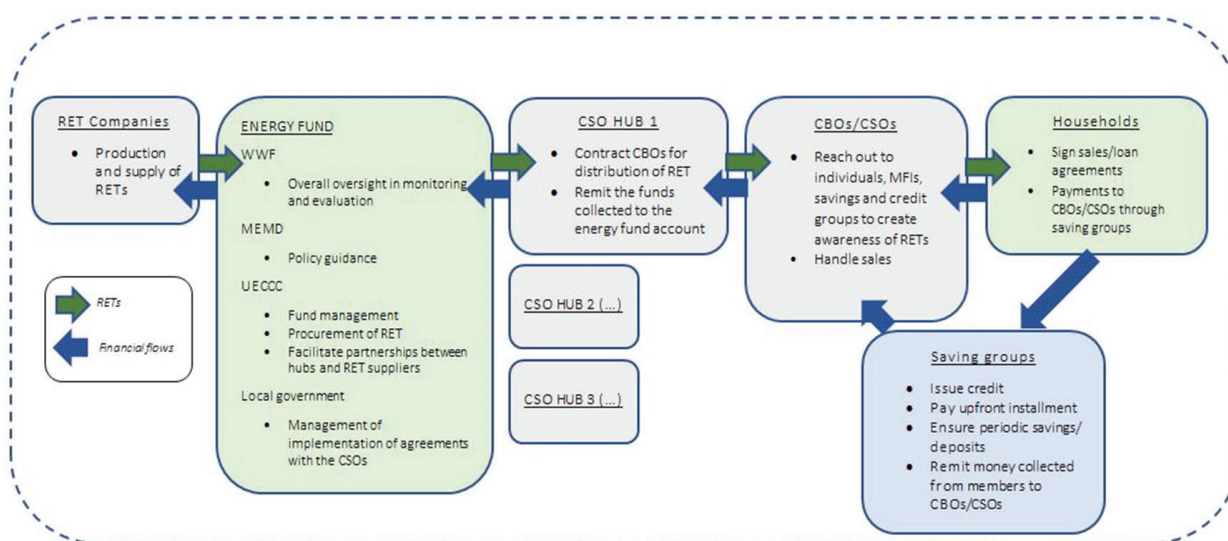
2.4 AFFORDABLE PRICE

The end-users have to afford the products to adopt them. However the target rural communities are not able to do so mainly due to the high upfront cost associated with the RETs. This situation is worsened by the fact that people in these areas have seasonal sources of incomes and limited access to consumer financing options, and can hardly afford such an investment.

To contribute to addressing this challenge, WWF-UCO is working with CSOs and rural-based financial intermediaries (microfinance institutions, savings and organized groups) to develop favorable consumer financing mechanisms to enable local communities purchase the technologies. Since 2017, WWF-UCO has

procured and delivered RETs to CSOs as start-kits. This allowed the CSOs to mobilize rural men and women with low incomes to acquire the products and pay back in installments over an agreed upon period. In the process, WWF-UCO started building up an Energy Access Fund intended to be used to reach more people in the communities with RETs after the initial start -kit financed by WWF-UCO. The Energy Access Fund is further elaborated in **figure 4 below**.

Figure 4: Stakeholders and functions related to the Energy Access Fund



2.5 CONDUCTIVE POLICY & REGULATORY ENVIRONMENT

WWF-UCO collects and shares the lessons learnt which should feed into the relevant policy mechanisms to ensure an enabling environment in the long run and to promote further expansion of the approach within and beyond the target districts. Additionally, the lessons learnt report should inform relevant governmental authorities about the factors that are essential to set up an enabling environment to facilitate universal energy access in Uganda.

The lessons learnt are based on findings from studies and evaluations, best practices, models, opportunities and challenges that impede scaling-up of renewable energy access in the country.

Regarding policy review, WWF-UCO and partners have shared position papers to advise government on how they can take forward work on increasing energy access, with focus on off-grid renewable energy solutions.

Currently, government focus appears to be mainly on grid electricity supply and distribution but this is not resulting into most Ugandans accessing electricity. On-grid electricity infrastructure runs up against the fact that around half of Ugandan households are scattered in remote rural areas, with very high grid connection costs and very low household demand even when the rural households are connected. As such, off-grid and decentralized energy solutions have a key role to play in increasing access to renewable energy in the country, especially for remote off-grid areas as well as grid proximate consumers who cannot afford grid electricity. Off-grid solutions if given more attention can speed up and enhance the goal of achieving universal energy access in Uganda. **Therefore current and future planning by government should take due consideration on striking a balance between on-grid and off-grid energy solutions.** Our recommendations will focus on the later.

Our call to MEMD is **specific off-grid approaches should be prominent in the national policy and planning.** This should be further supported with the **development of a strategy for replication and scaling-up of distributed renewable energy systems** based on the good practices, lessons and models by WWF-UCO and other stakeholders implementing similar on-ground initiatives. This strategy should focus but not be limited to the following:

Financing: Government should increase budget allocations for off-grid and decentralized energy solutions to meet electrification and clean cooking needs for Ugandans and also put in place policies to attract private sector investments to deliver off-grid solutions in the country. Appropriate incentives such as exemptions and subsidies, if put in the right policy framework, shall promote private sector investments in off-grid solutions to provide remote consumers with affordable entry-level electricity services.



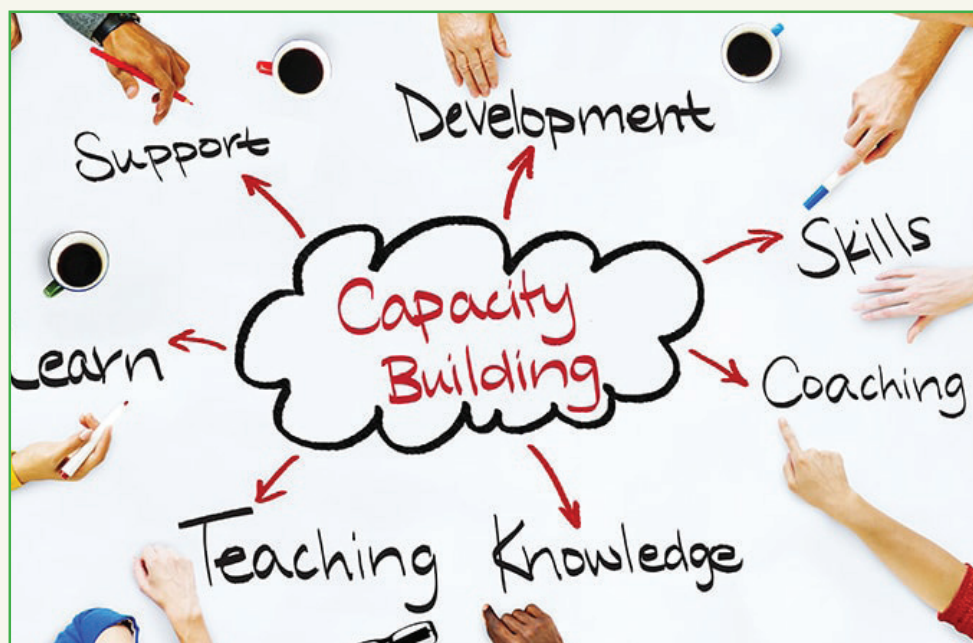
There is also need to explore blended finance models to provide private sector and consumer financing for clean energy projects in the country. A number of models have been tested by private sector, civil society and development partners to promote sustainable financing mechanisms for low income communities to have access to clean energy. However these need government support to be scaled-up. Examples include: a) Pay as you go models where customers pay an upfront cost and then small installments over an agreed upon time period for the energy service using mobile phones, b) Customers can access credit from cooperatives, village saving groups or other local based intermediaries to meet the upfront cost of acquiring off-grid solutions, and then pay back later with low interest, and c) Revolving energy fund which can provide working capital to companies dealing in off-grid electrification and clean cooking as well as flexible clean energy loans to consumers.

Market activation: Government should support private sector in expanding distribution networks (sales outlets and distribution partnerships) to penetrate remote areas. Such support may be in form of technical assistance based on lessons learnt elsewhere to develop scalable business models and provide incentives (through results based financing) to ensure that off-grid energy solutions and services are accessible to target end-users in rural areas.



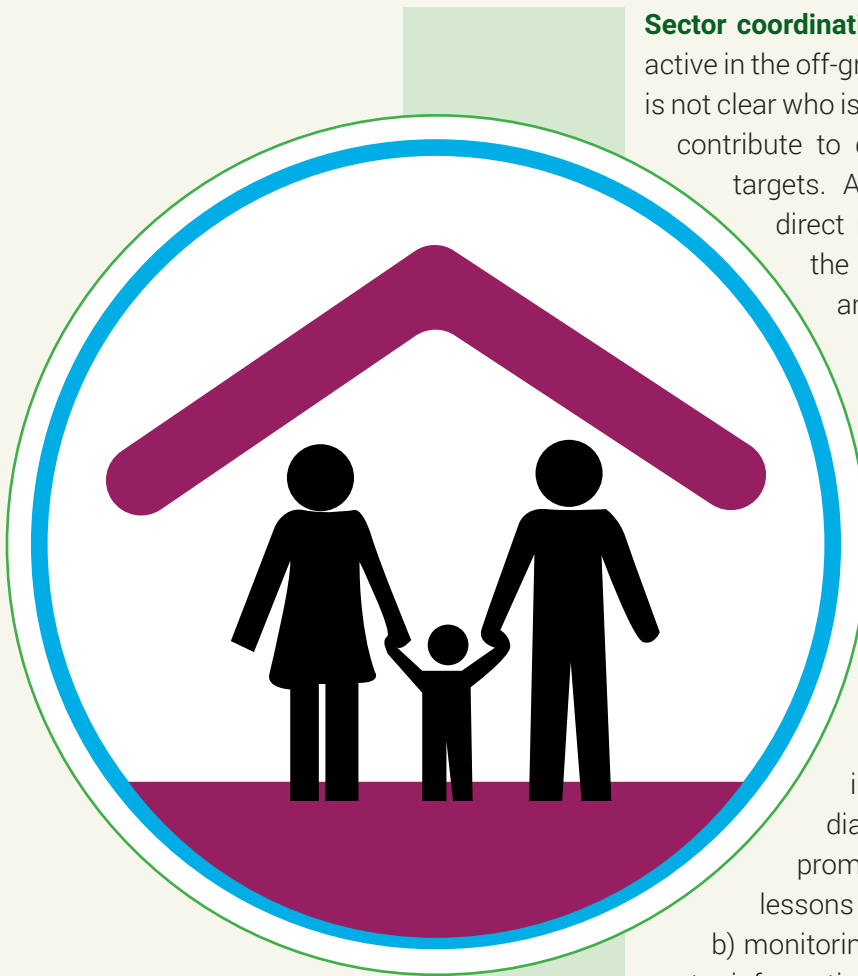
Consumer protection and awareness: This is one of the major challenges limiting wide scale adoption due to the proliferation of sub-standard energy products on the market and yet consumers have limited knowledge to make informed choices. There is need for government to finalize the standard development and certification for off-grid solutions as well as intensify enforcement mechanisms for existing standards to restrict market access for low quality renewable energy products. There should also be provisions for establishing certification regimes for manufacturers and/or installers of solar and clean cooking technologies. All this should be implemented in parallel with wider outreach/sensitization programs to inform and create awareness to consumers on good quality products.

Capacity building: There is need to build technical and institutional capacity at district local government level to decentralize renewable energy issues and ensure that modern energy services are brought closer to the people. This further streamlines mechanisms for district inputs to feed into national planning and decision making processes on energy at central government. MEMD should support and move forward WWF-UCO's efforts in working with local governments to nominate energy focal persons, support trainings and development of district renewable energy strategies. Developing a strategy with targets and agreed actions is one of



the key steps a district needs to make in order to solve these challenges with local resources and solutions that work in the local context. Renewable energy strategies are key in assisting districts to create enabling policy and regulatory environments for renewable energy technologies to be promoted and sold in their districts as well as mainstreaming energy planning in their development plans and budgets. With strategies in place, districts will be better placed to work with MEMD, attract businesses and other investors in the districts to take advantage of the momentum that has been created by WWF-UCO as well as sourcing for funds to spur renewable energy developments.

Furthermore, government should mobilize resources to supplement capacity building programmes conducted by private sector and civil society to provide basic and advanced trainings that will equip relevant stakeholders with technical and business skills to facilitate promotion of off-grid solutions in the country.



Sector coordination: There are a number of stakeholders active in the off-grid energy space in the country. However it is not clear who is doing what and how the collective efforts contribute to delivering the renewable energy access targets. Additionally, renewable energy access has direct nexus with improvement in the state of the environment, education, health, women and youth empowerment to mention but a few. This therefore calls for an integrated approach to address the underlying challenges across the various sectors as well as develop strong monitoring, verification and reporting systems to aggregate actions.

Relatedly, government should establish and ensure functionality of coordination mechanisms around:

- a) implementation modalities through inter-ministerial and multi-stakeholder dialogues to facilitate joint actions as well as promote cooperation and sharing of synergies, lessons and experiences among sector players,
- b) monitoring and evaluation to collect key statistics, sector information and data amongst stakeholders and the wider public, and c) reporting through creation of a database which can act as a reliable source of data to inform policy and practices on renewable energy access.



WWF
ENERGY
ACCESS MODEL



2019

APPROPRIATE AND HIGH QUALITY PRODUCTS

The projects implemented by WWF-UCO offer a large product range of various sizes and types that are appropriate for the needs of the communities. These products also require minimum maintenance

EFFECTIVE AND EFFICIENT DISTRIBUTION NETWORK

WWF-UCO is facilitating linkages between RET companies and civil society organizations (CSOs) to facilitate last mile delivery of RETs

EFFECTIVE DEMAND

The community meetings and door to door marketing allow for direct interaction with the target groups which helps to build trust and also enable communities to verify for themselves the benefits through product demonstrations.

AFFORDABLE PRICE

Since 2017, WWF-UCO has procured and delivered RETs to CSOs as start-kits. This allowed the CSOs to mobilize rural men and women with low incomes to acquire the products and pay back in installments over an agreed upon period

CONDUCTIVE POLICY & REGULATORY ENVIRONMENT

WWF-UCO collects and shares the lessons learnt which should feed into the relevant policy mechanisms, plans and related documents to ensure an enabling environment in the long run and to promote further expansion of the approach in Uganda



Why we are here

To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

www.panda.org/uganda

For more information:

World Wide Fund for Nature, Uganda Country Office,
Plot No.2 Sturrock Road Kololo, P.O. Box 8758 Kampala - Uganda
Tel: 0200 510 800

Email: kampala@wwwuganda.org



WWF Uganda



@WWFUGanda



WWFUGanda



WWF Uganda