

Business and Financial Models in the uptake of solar lighting
In
Kenya

A report by the Lighting Africa-Women Initiative

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1 Introduction

1.1 Background and Context

This report is part of a broader Lighting Africa study done in conjunction with the Women in Business group of IFC. The study sets to address the challenges faced by women as consumers and as entrepreneurs of off grid lighting products. Specifically this report will:

- Describe business models for women as consumers and entrepreneurs
- Identify and analyse SME opportunities for women in Kenya

1.2 Why off-grid solar lighting?

Proper lighting is an important basic need, whose absence hinders social and economic development. It is one of the most essential end-uses of electricity in the rural areas. However, nearly two billion people around the world have no access to electricity. According to the IEA's World Energy Outlook (WEO)¹ 2011, nearly 60% of the population, some 587 million people, lack access to electricity in Africa. In addition only 12% of the Sub-Saharan population has access to electricity. As a result of this, the population relies on expensive, inefficient and polluting lighting sources such as candles, kerosene or firewood. In addition, Lighting Africa estimates that about 700 million Africans will be living without electricity by 2030 which calls for interventions to reverse these statistics

The low electrification rate and limited grid access is prevalent also East Africa which currently stand at 16%, 9% and 14% in Kenya, Uganda and Tanzania respectively (IEA, 2011). Further, it is worth noting that areas that are grid connected are also faced by frequent power outages that warrant an alternative lighting technology.

Solar technologies are gaining popularity in East Africa in addressing rural lighting as a result of: liberalized solar market, diversity of solar lighting products, reduction of the price of solar panels and accessories in the international market. In addition, the high solar insolation makes the region best placed for embracing solar lighting technology.

.The introduction of efficient lighting technologies using LED technology is playing a role in creating more access to clean, efficient and reliable energy services to consumers at prices that are comparable to typical expenditures for kerosene lamps.

As a result the LED technologies that focus on off-grid solar applications promise clean, durable and high quality solutions for people and can indeed fulfill the lighting needs for rural households. Solar LED technology has many advantages over kerosene and candles such as:

- Cheaper (see table 1)
- Better illumination,
- No smoke, no fire risk among others.

Table 1: Comparison of solar and kerosene lanternsⁱⁱ

Characteristic	Kerosene lantern	Solar lantern
Capital cost	Low	High
Cost of fuel	Depends on usage	Nil
Replacement cost	Low (replaceable items being glass chimney, cotton wick)	High (replaceable items being CFL, battery)
Availability and reparability	Very good even in remote locations	Poor due to limited sale and servicing outlets
Lumen output	Low	4- 5 times higher
Safety aspects	Fire and health hazards due to smoke	Safe to use
Subsidy burden	Recurring burden of fuel	One time burden of capital subsidy (if provided)

Source: Chaurey, A., Kandpal, T.C. (2009)

1.3 Experiences on off-grid solar lighting in East Africa

Solar lighting uptake in East Africa has been growing fast in the last decade. These initiatives though most of them are donor funded have helped demystify the technology resulting to high appetite at all levels, that is both households as well as institutional. This section documents initiatives that have been implemented in the region in the past five years. They offer insights on the impact solar lighting can cause in an off-grid community.

1.3.1 Barefoot Project – Ugandaⁱⁱⁱ

The project target area was Musubiro Village in southern town of Masaka, Uganda which has no grid electricity. Typically, the daily activity comes to a halt at 7.00pm when the sun sets. The main source of light in the area is kerosene- which is not only expensive, but has a myriad of negative health side effects, and the fire risk that always comes when the dwellings are made of straw thatched roof. Barefoot Power, a for-profit social enterprise operating across East Africa, has built a network of “Solar Entrepreneurs” who are responsible for bringing solar lighting to towns and villages like Musubiro all across Uganda. Their products, ranges from the extremely popular “Firefly Mobile”, a small 1.5 watt panel with 12 small LED lights and a phone charger, or their full “Village Kits” that can provide lighting to an entire house, are making solar power affordable and accessible to those at the base of the pyramid. Barefoot Power currently has 160 Solar Entrepreneurs operating all over Uganda, and an extensive distribution network which makes its products accessible to customers across Kenya, Tanzania, India, and several other parts of the world where it operates.

1.3.2 The School Solar Lighting Project (SSLP)^{iv}

The Regional Institute for Social Enterprise (RISE) started a project to install Solar Systems in schools in Mwingi and Kitui County in 2008. In the first phase each participating school was fitted with a 120 watt solar panel, a 100 amps Solar battery and a solar inverter enough to light two classrooms, staff room, the head teacher’s office and one security light. The project started with 3 primary schools on a pilot basis and with further funding, it has been expanded to cover 9 schools.

The project has so far benefitted over 5,000 pupils from the 9 schools currently under the project. The target of the project is to equip 100 schools with solar systems. The learning in schools takes place daily from 5.00am to 6.00am and from 7.00pm to 9.00pm, thereby giving each pupil four extra contact hours with their teachers. The initiative has a direct effect on the pupils' performance as compared to how the schools used to perform before the installation of the solar lighting.

1.3.3 Green Forest Social Investment Trust (GFSIT) Women Solar Energy Project

GFSIT is a non-governmental organization (NGO) operating in Kenya in Kisumu, its activities target empowering women in rural areas through the provision of renewable power, easing domestic chores, especially when night falls and helping village women come up with income generating activities.

According to GFSIT, village women spend between Kenya Shillings KES 850 to 1,200 [approximately US \$10 to \$15] every month on lighting alone.

GFSIT partnered with the Barefoot College in India, which trains semi-illiterate rural women to fabricate, install and maintain solar lighting systems in villages. Under the Village Solar Committees (VSCs) program, women contribute between KES 500 and 800 [approximately US \$7 to 10] on a monthly basis from each household to keep the program running. The village women also started income generating activities that include a posho mill that is powered by solar energy to generate some income for the women groups and a small workshop where local youth can gain skills and make a living while supporting the village solar program as well.

1.3.4 KickStart Sustainable Energy Fund for off-grid solar lighting in East Africa^{vi}

This programme was a joint initiative between Eight19, the developer of the IndiGo pay-as-you-go solar power system and Sunny Money, a social enterprise distributing solar lamps in East Africa owned by SolarAid. The partnership is aimed at expanding affordable solar lighting to rural off-grid communities in East Africa. The initial investment funded the deployment of 4,000 *IndiGo* units.

KickStart provided working capital to accelerate the roll-out of IndiGo pay-as-you-go solar lighting products in rural off-grid communities. Users receive solar lighting and in-home phone charging, which they pay for on a weekly basis using scratch cards, just like a pay-as-you-go mobile phone. Users purchase scratch cards at approximately US\$1 per week for a standard system, which represents less than half the typical cost of the kerosene lighting and phone charging spend it displaces. The revenues from the scratch cards recover the cost of the solar units and are returned to KickStart to allow the deployment of additional units to new users.

The IndiGo technology is geared to providing an affordable means of delivering electricity using the sun's power to generate clean, renewable energy at the point of use. It allows users to buy electricity as a service, avoiding the expensive upfront costs normally associated with solar products. Each IndiGo system consists of a low-cost solar panel, a battery unit with inbuilt mobile phone charger and a high efficiency light emitting diode (LED) lamp.

1.4 Why solar lighting for women

Solar lighting is an area that can create an impact on women because most of a woman's time is spent on household chores. This is supported by ESMAP Survey which showed electrification

reduced the amount of time women spent on household chores like collecting fuels, fetching water and cooking. Hence, provision of quality lighting would therefore increase the time women spend in productive activities even after dusk.

The above observation is also emphasized in an Energy, Poverty and Gender (EnPoGen) Study undertaken in Sri Lanka^{vii} which showed that electrification effectively reduces time women spend on household activities. The benefits of electrification on women cannot be doubted, women are often disadvantaged in the energy access equation due to various socio-economic and cultural reasons. Some studies have shown that women have lower access to finance and energy-related services than men in many African countries. For example, data from the World Bank Group's Enterprise Survey^{viii} shows that access to grid electricity for women-headed businesses is generally impeded compared to men.

In addition, good lighting creates new opportunities for social interaction and personal experience by women. In major towns, social life usually comes to a standstill when there is power blackout in the evening. This is part of the daily life in rural areas without reliable lighting sources. Thus, lighting that is more convenient, less expensive, and safer to operate creates the opportunity to enjoy these social and personal activities more frequently and with greater ease. It also creates a feeling of safety and security from intruders and potential harm.

The significance of power for lighting should not be underestimated. Poor lighting impacts negatively on education of African girl and boy child since they are not able to undertake healthy school homework. Therefore supplying lights in the rural areas allow students to study into the evening hours. In the long term, this creates a greater potential income gain for families than uses that generate income directly as education is bound to open many avenues for wealth generation. Improved lighting can increase women's literacy, education, income-earning options, and security in public areas.

In most of the rural areas, women who play a major role in their homesteads mostly depend on kerosene for their lighting needs. However, world oil prices appear likely to continue to be volatile and generally increasing over the coming decade, and kerosene prices will likely follow a very similar pattern^{ix}. The high cost of kerosene is a significant concern for many rural families. The fact that kerosene has a higher cost when purchased in small quantities is common in many rural areas, also means that the economic benefits of a switch to modern off-grid lighting based on solar photovoltaic technology which has a low operating cost are larger. In some instances, fire from firewood is used as the lighting source. The indoor pollution caused by firewood jeopardizes the health of women and girl child who are directly affected. Biomass related sources have two key disadvantages of smoke emissions and time spent gathering the biomass. Further, this fuels deforestation which impacts climate change.

It is therefore obvious that provision and access to improved off-grid lighting including solar lighting technologies enables women to move up the energy ladder with numerous benefits.

2 Business Models for effective Dissemination of Solar Lighting in Kenya

Currently the solar PV sector has been growing at a very fast rate. This has resulted to the innovation on various mechanisms to enhance the solar lighting outreach to the market and end-users. The growth of diverse approaches is driven by different market needs and segments that require unique approaches from one another. It is against this background that this section is dedicated to understand the various existing business and finance models in operation, how they have been used, opportunities presented by each and what need to be done to make them more effective under the lighting Africa programme - Women Initiative.

When structuring solar lighting products financing and supportive mechanisms, it is fundamental to take the following parameters into consideration where applicable:

- Transaction size and target market characteristics
- Security and credit structure of the loans for lenders and if applicable for guarantors
- Creditworthiness of the target group of borrowers, how to analyze and manage it
- Defining the chain of the financial intermediation and the source of funding for making the loans
- Collateral value of equipment and how to realise it in default situations
- Transaction cost management from loan origination to deal closure
- Marketing plans and strategies to generate and scale up deal flow and expand geographic coverage of the products
- Maintenance and after sales service
- Finance terms and making an affordable attractive offer to the consumers

For solar lighting Women Initiative to be effective, it is fundamentally important to understand the socio-economic structure of women in the society. This will help in targeting them with the right business model and or designing a model that is appropriate for each women segment. Hence this document foresees two broad types of models that need to be assessed namely:

- Consumer based model
- Enterprise based model

2.1 Consumer Based Model

Consumer based model can be categorised into three groups:

1. **Organised groups:** These include those women who are in organised groups such as Rotating Saving and Credit Associations (ROSCA), Accumulation of Saving and Credit Associations (ASCA), Saving and Credit Cooperative Organisations (SACCOS), Community Based Organisations (CBOs) among others.
2. **Salaried people:** this comprises of women who are employed in organisation and are paid salaries or wages. They fall in two categories:
 - a. Permanent employed
 - b. Casual labourers

3. **Individual end-users:** This is comprised of women who are operating as individuals and have no affiliate attachment to the above categories. However, they constitute a huge solar lighting market.

2.1.1 Organised Groups

Women in communities are organised in different forms of groups more than men. The primary aim of these groups is to enable them achieve specified socio-economic objectives. Hence they form a viable platform to intervene and reach many women in a more effective and efficient manner. The common types of organised women groups include: ROSCAs, ASCAs, SACCOS, CBOs, and Market Associations in market places among others.

In this model, the solar company engages the organised group/s by introducing the solar products. They negotiate the terms and once agreed, they enter into a cooperation agreement where each party's responsibility is stipulated. The group undertakes a book building of interested members – these are women who have paid a deposit to activate a product order. Once the minimum order is attained, the group request the solar company to supply the solar lighting products.

The members of the group pay for the product on instalment basis for a period of 3 to 5 months depending on the size of the solar lighting product. The group official undertakes to collect the instalment on behalf of the solar company every time the group meet – mostly weekly or monthly. The company conducts consumer education on solar products through meetings that are facilitated by the group officials. To make the process more attractive to the group, the group earns a commission on every solar products bought. In Kenya, the model has been used by Greenshield Technologies to enhance uptake of solar lighting by women in Machakos and Nyahururu region.

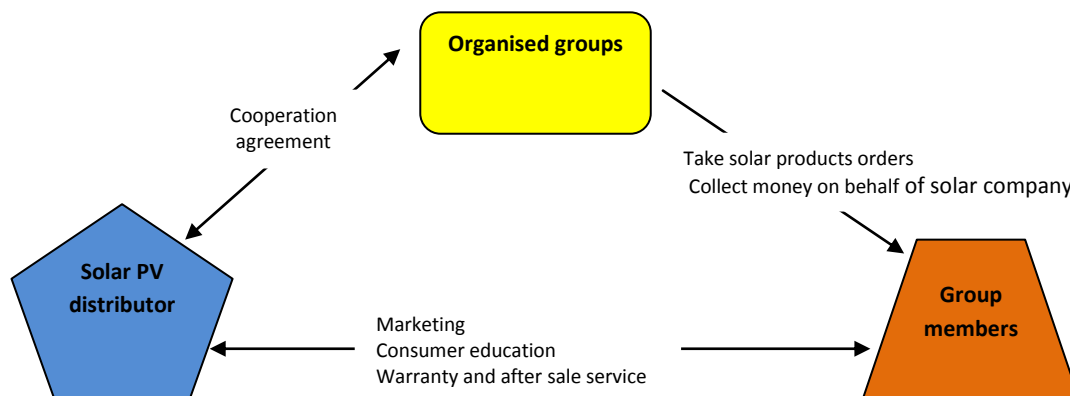


Fig 1a: Group based model

Gaps in the model

- Most of the solar distribution companies are not well capitalised, they do the following activities on a limited scale:
 - Marketing and consumer education;

- Rarely undertake group strengthening due to lack of capital hence relies on the existing framework despite obvious gaps;
- Solar companies have weak distribution network and as such, majority of solar companies are based in Nairobi. This impacts negatively on after sale service as return time is longer.
- The groups are village based with loose structure, this present a default risk in case the group collapses which would mean loss to the solar company.

Opportunities of the model in scaling solar for women

The model has lots of potential in Kenya considering that groups are not a new concept hence a viable platform that solar lighting dissemination can ride on. Given that groups are formed to achieve certain socio-economic objective by both rural and urban populations. Majority of these groups are women led, hence offering a viable proposition for solar lighting dissemination.

To enhance the process effectiveness, there is a need for a dedicated support on a number of fronts namely:

- To provide capacity building (management, group dynamics) for these groups to act as viable vehicle for solar lighting disseminations;
- Provide consumer education to these groups ;
- Support in marketing through provision of marketing materials as well as use of electronic media especially through regional/ local radio stations.

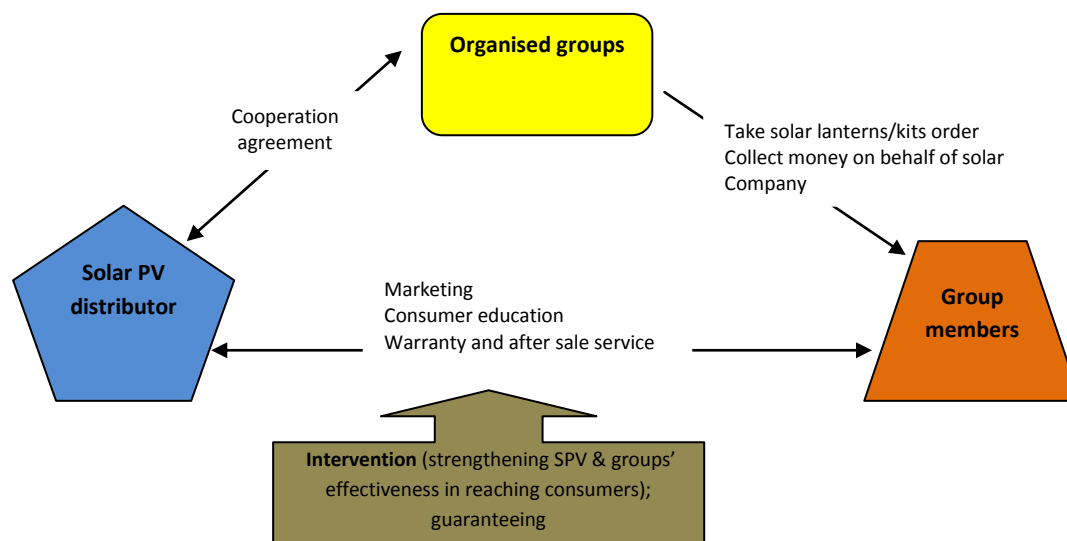


Figure 1b: Consumer model through organised groups

2.1.2 Salaried Consumers

The category of working group is critical to the uptake of solar lighting products for the off-grid community. However, it should be noted that though this category earns an income on a monthly or weekly basis, majority of them lacks disposable income as they are low income earners. This implies that, they are critical target for the solar lighting as majority use kerosene and candles for lighting. Hence it is important to target them based on their conditions that will accelerate the solar lighting uptake.

The target majority are in organisations with mass workforce with majority of the workers being women. In Kenya, these include: garment factories that employ hundreds of women, horticultural farms especially flower farms in Naivasha and Nanyuki; coffee plantations in Central Highlands, sisal plantations in Coastal province, and tea plantation in Kericho and Limuru region and a pool of primary school teachers.

The salaried consumers are drawn from two categories namely:

- i. Permanent employees
- ii. Casual employees

2.1.2.1 Permanent Employees

This is a category of employees who are on a long term contract of more than a year on a continuous basis. In the target organisation, they form a significant size that should not be ignored. The common approach to this category is through a Company Sacco as most of these organisations have SACCO that meets the financial needs of the workers. This model has been used by Suntec¹ in reaching out the Tata Magadi Soda workers; Barefoot Smart Solar, a solar company has been working with a number of tea plantations in Kericho to meet the lightings of the workers. The model works as shown in figure 2a below.

¹ Suntec is a solar lighting distributors of Trony solar brands

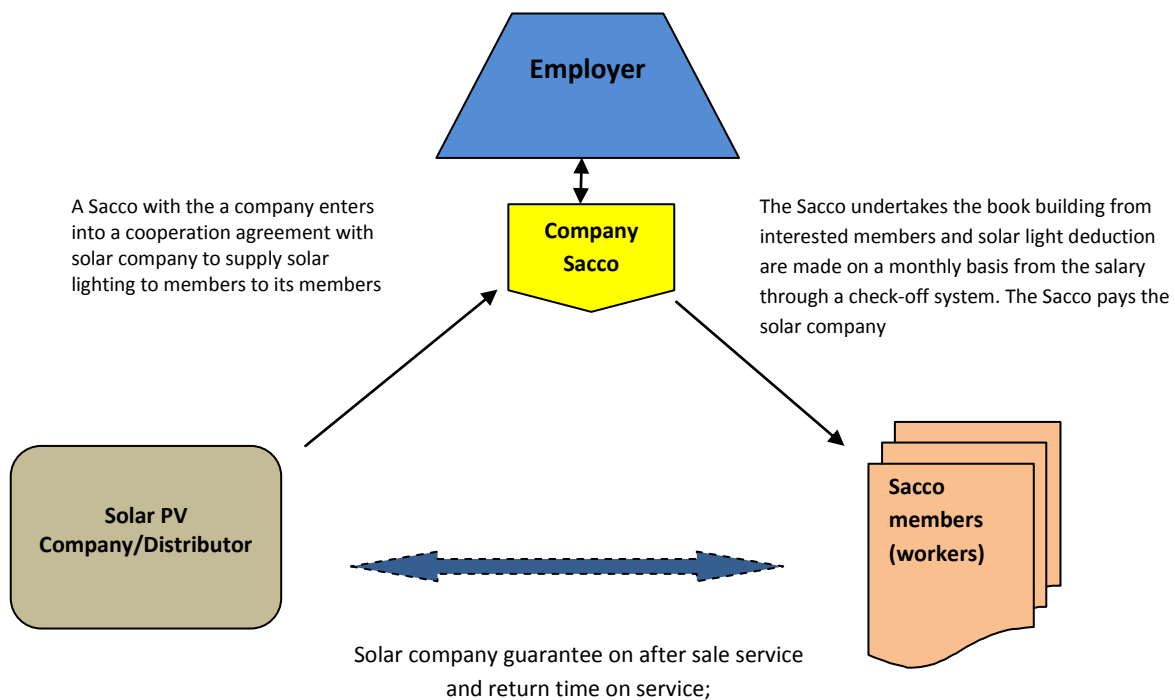


Figure 2a: Permanent salaried workers

2.1.2.2 Casual Employees

The casual employees' are engaged by the company as and when there is work on the farm or in the factories and earn their income on a daily or weekly basis. As a result, their income is intermittent. Hence, a different model is required to suit their circumstances. They constitute the largest number of farm workers in plantations such as horticulture farms, tea farms, coffee plantations, sisal plantations, sugar canes among others. Casual employees are an important target group since a significant amount of their household budget is used on kerosene and candles. Therefore, a targeted model is required to facilitate a transition from dirty and hazardous fuels to clean lighting technology. The model in figure 2A locks out casual employees.

Gaps in the model

- The model is still at nascent stage on a number of fronts. This is partly due to lack of good information by the management of these plantations/farms on the potential role solar lighting can play on their members livelihood improvement; Low level of marketing by Solar companies targeting these farms due to lack of understanding of how farm based companies are structured and works.
- On the side of casual workers, this segment has been locked out due to the risk involved and lack of formal relationship with the Company Sacco.

Opportunities of the model in scaling solar for women

- The model has huge opportunity in Kenya taking into account that majority of workers in these plantations/farms are women who happen to be at the Bottom of the Pyramid (BoP), a right target for the solar lighting initiative.
- Taking into account majority of women working on these plantations/ farms, there is a need to bring a third party guarantee to cushion the solar supplier as well as the Sacco which is an existing infrastructure to ride on.
 - **How the guarantee can work:** The risk involved in working with this category of workers needs to be shared by the parties while at the same time the consumer of the solar lighting product is made to own the solar loan. Hence, the qualifying consumer (**see criteria below**) will be required to raise 25% of the total cost of solar lighting kit and the balance is paid on a weekly or monthly basis as may be agreed. The loan guarantee by a third party can be upto 50% of the cost of solar products and the solar company takes a recourse on the remaining balance of 25%. This means the entire cost of solar lighting kit is covered and distributed among the stakeholders hence reducing the risk of solar company to facilitate this group from accessing the solar lighting products. The solar company initiates a product loan guarantee with a third party independently to enable them supply the products to the casual employees. The guarantee can only be absorbed by the supplier/SACCO after all collection avenues are exhausted.

Criteria for Casual workers to qualify for solar product loan

- A casual worker must have worked in the company for at least 3 months – this does not have to be continuous but has been engaged often for such a period;
- The company recommends the members who are diligent as they have an experience with them;
- The worker will be required to raise a 1/4 of the total cost of the solar product;
- The worker agrees the balance to be deducted from her wages on a weekly basis for the agreed period.

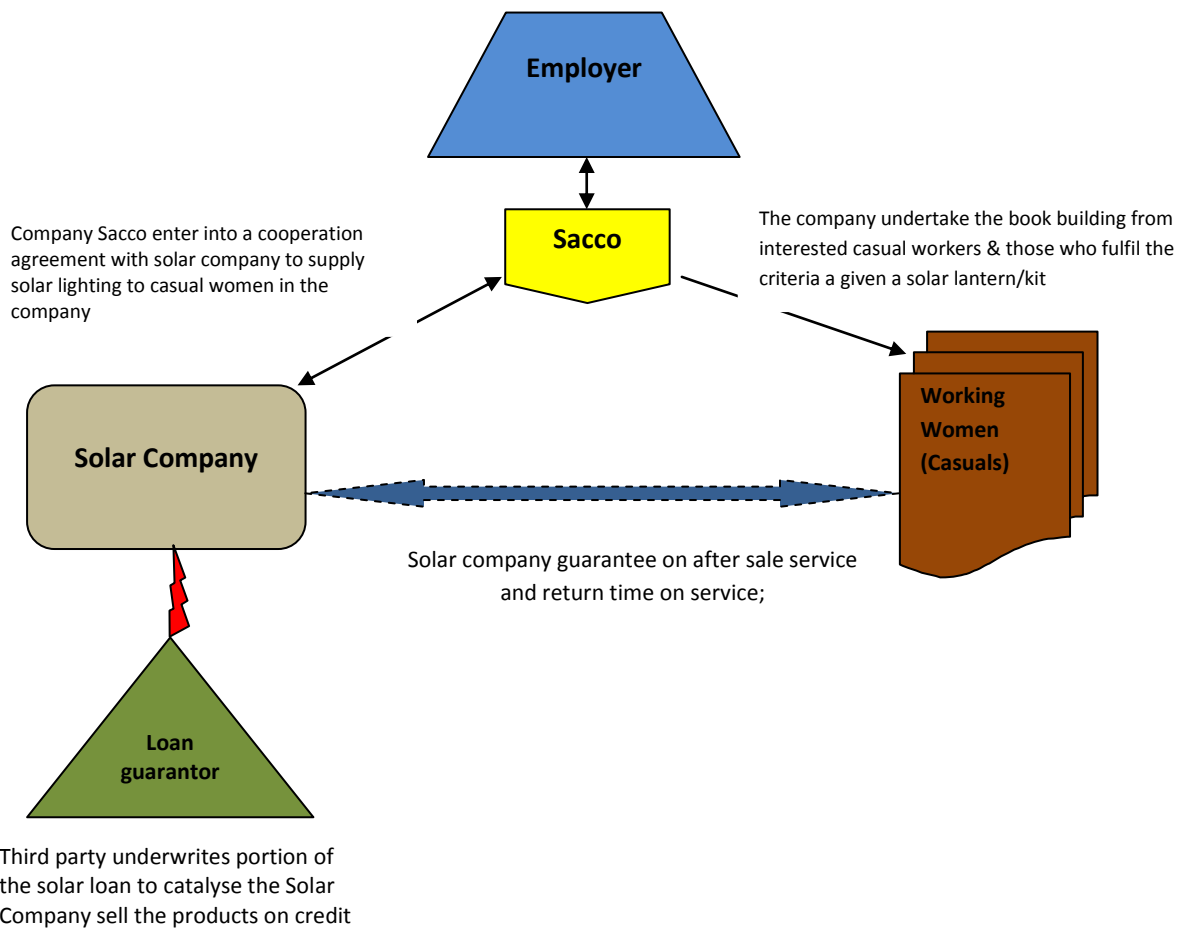


Fig 2b: Model for employed women casual workers

2.1.3 Individuals Consumers

These are women who have no attachment to any institution and present themselves as candidates for solar products. The above models will not work for them and therefore require a different approach that suits them as well as that which reduces the risk drastically to the solar Company. Two business models address the needs of individual consumers namely:

- Pay-to-Own (PTO). This can be applied anywhere in the country where there are solar PV outlets.
- Consumer microfinance approach

2.1.3.1 Pay-to Own Model

The consumer approaches a solar product outlet and fills an application form to open a solar account. The outlet vendor appraises the consumer and upon his satisfaction based on the terms and conditions stated, an account is opened. To activate the account, the consumer is required to make an initial deposit and the balance is paid on instalment basis based on the agreed terms and conditions. On completion of payment, the consumer is given the solar lighting product and the

account is closed. The payment period is dependent on the size of the solar lighting product. The payment could range from one month to four months. The model has been applied by Greenshield Technologies in reaching out individual consumers in Murang'a.

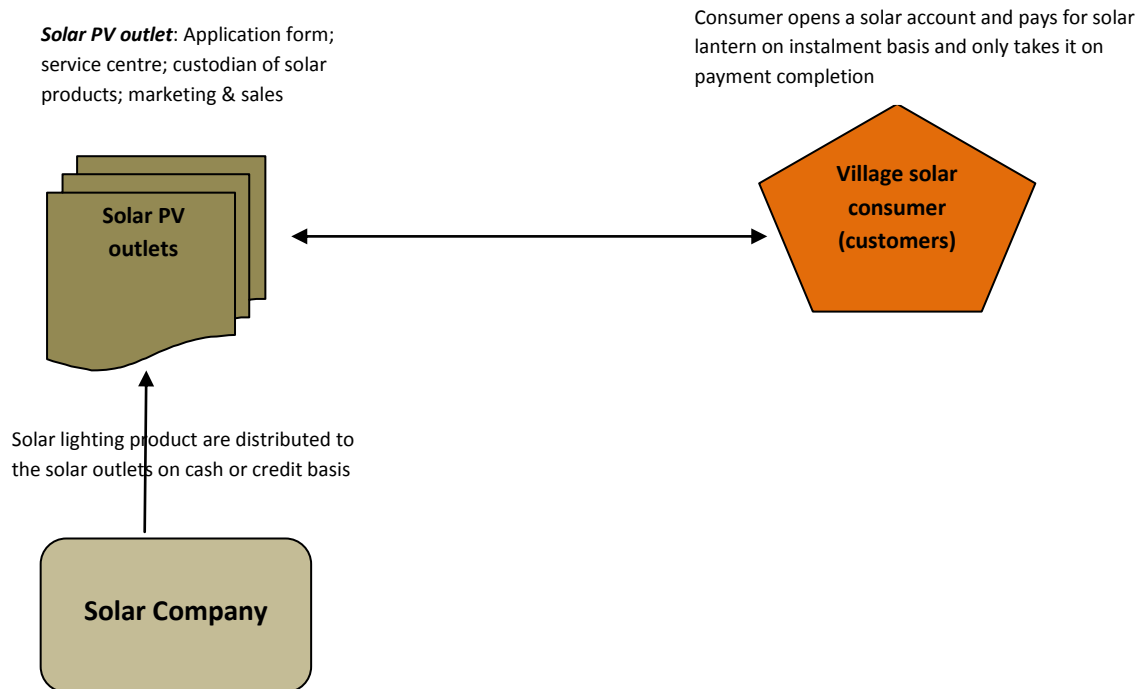


Fig 3: Pay-to-Own Model

Gaps in the model

- The solar lighting products outlets lacks the necessary skills because they are mainly rural based;
- The solar lighting products outlets lack financial resources to market or employ sales agent to market the products in the villages;
- The model is still very new but where it has been piloted, it has worked successfully, as it can substitute cash sales for the Bottom of the Pyramid.
- The model requires a dedicated effort on consumer education as well as linking the consumers with appointed solar lighting outlets in the village.

Opportunities of the model in scaling solar for women

- The model offers an excellent opportunity to scale the solar uptakes to women who are neither employed or belong to a group;
- It is viable model for a woman who earns wages on a daily or weekly basis by working on farms as it is a disciplined mode of value added saving to acquire solar lighting and can support this category greatly to acquire solar lighting in a simplified manner;

- It offers an alternative to expensive microfinance approach.

2.1.3.2 End-User Microfinancing

The microfinance approach is where consumers of solar lighting products apply for a solar product loans. They are given a product instead of cash money. The MFI works with a selected solar company to supply solar products to the MFI clients through a loan. The model takes advantage of the existing network of loan officers who acts as marketing agents as well as the MFI clients. In Kenya, the model has been used by Kadet MFI, Faulu Deposit Taking MFI, Small Microenterprise Programme (SMEP) Deposit Taking MFI and Kenya Women Finance Trust (KWFT) Deposit Taking MFI.

The model has two sub-types as shown in figure 4A and B

1. Through MFI directly
2. Through a subsidiary company owned by the MFI

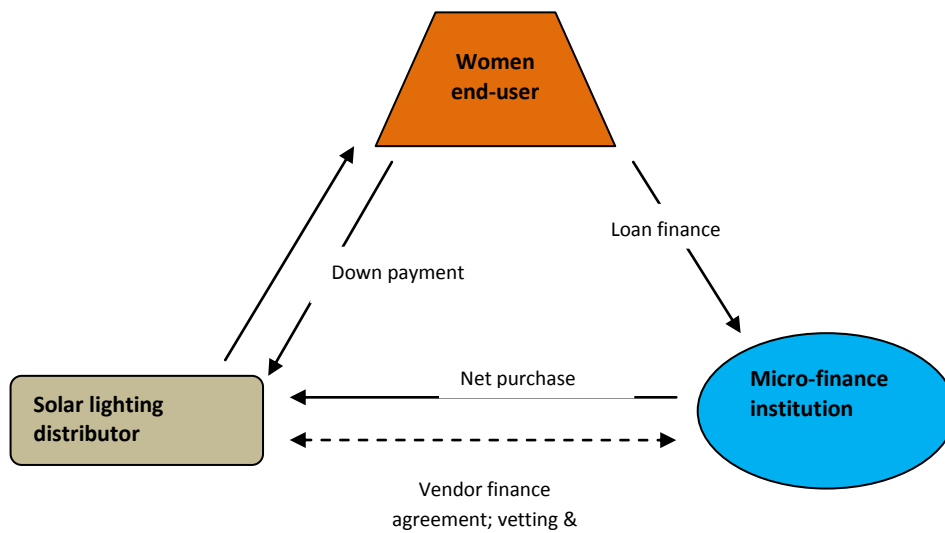


Fig 4a: Micro-finance consumer finance (working with MFI directly)

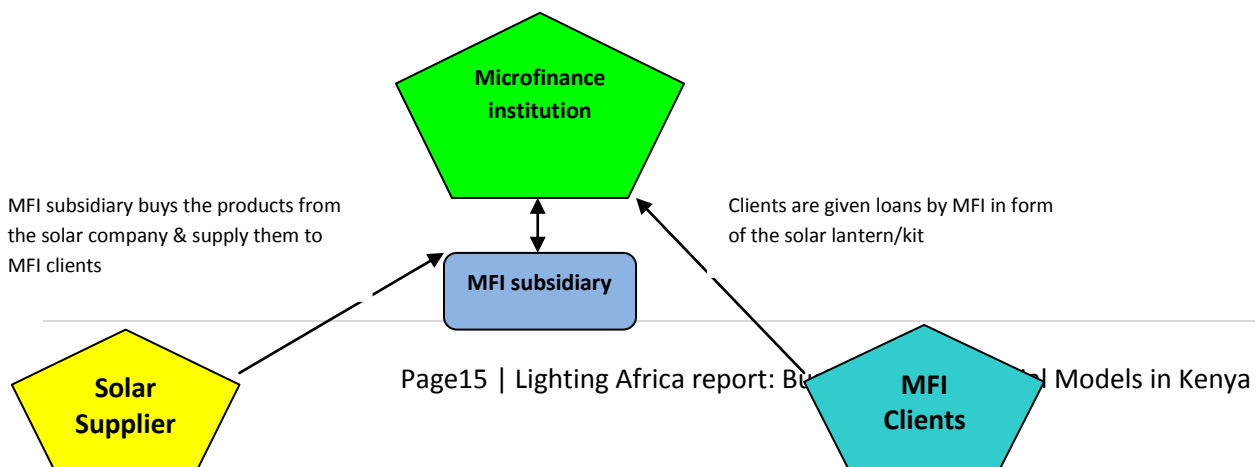


Fig 4b: Microfinance based consumer model through an MFI subsidiary

Gaps in the model

- The clients have different needs and therefore one solar product type cannot accommodate the needs of all clients. Hence need to bring a number of solar suppliers on board with different solar lighting products;
- Loan officers have targets to sell financial products who perceive the solar product as additional work;
- The cost of the solar product end up being expensive due to high MFI operational cost.

Opportunities of the model in scaling solar for women

- The solar supplier can ride on the expansive network of the MFIs. For example, Faulu Microfinance Kenya Women Finance Trust (KWFT) which are considered among the leading MFIs in Kenya;
- It offers the consumers an excellent opportunity to pay for the solar product on instalment basis while at the same time enjoying the benefits of the solar lighting product. Hence, the saving from Kerosene could be used partly to off-set the solar loan hence reducing the burden.
- The large MFIs have fairly good local presence hence, an opportunity for women in villages to tap into.

2.1.4 Mobile Phone Payment Platform Model

Mobile phone payment model is still at nascent stage of development to be used as a vehicle for solar lighting payment. A number of pilots are being tested. The mobile payment platform can be viewed in two dimensions:

- **General mobile payment system:** this uses the Mpesa platform to make payment.
- **Customised mobile payment system:** this is integrated with solar system electronics. For the system to work, it requires activation which is done through a secret code provided upon recharge. It uses the principal similar to that of pre-paid electricity billing.

General mobile payment system: this can apply to any financing model. Payment is made through Mpesa platform to off-set a payment. The benefit with this approach is that it saves time and cost that one would have spent in going to a pay-point. The key advantage of this model is that, it makes the process user friendly, reduce paper work and enhance efficiency.

Customised mobile system: this is a more dedicated solar lighting mobile service that is integrated with the solar lighting product. The customer buys a recharge voucher from a specified outlet of a defined amount. He feeds the account number to his phone and sends the message to the defined

paybill number. The database responds with a coded message that the customer is supposed to enter into his solar lighting product is then activated. The payment is made on a weekly or a monthly basis and after full payment, the system is opened and the customer is no longer required to recharge it. If the consumer of the products fails to recharge the system before the payment is completed, it will not reconnect. In Kenya, this model is operated by 819 Solar Company and is being piloted in North Rift valley and Coastal region.

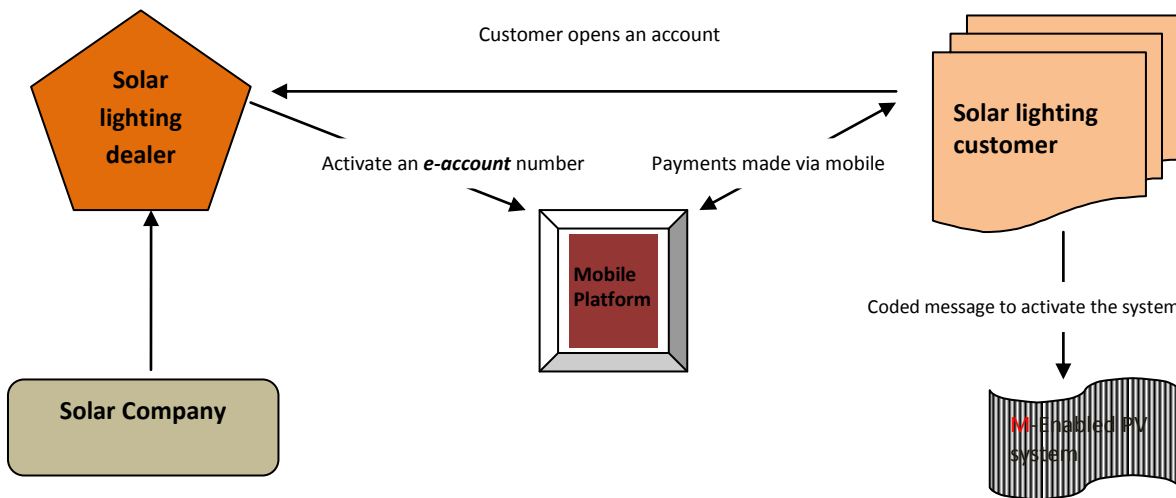


Fig 5: Mobile based solar payment model

Gaps in the model

- The model is new and requires further refinement to make it more available and user friendly;
- People who are illiterate or semi-literate may find it challenging to use. This increases the requirement for consumer education on the model.

Opportunity of the model in scaling solar for women

- The Mpesa platform is well developed and has opportunity to be used in rural villages as research shows that every household owns a mobile phone.
- The customised mobile system can be used for consumption as well as entrepreneurial purposes.

2.2 Enterprise Based Models

The following enterprise models have been considered.

- Microfinance model
- Guarantor model
- Dealer model
- Cash sales model.

2.2.1 Microfinance Model

The MFI identifies a solar products supplier and enters into a contractual relationship where the MFI works with solar entrepreneurs drawn from the areas they operate in. In this model MFI identifies entrepreneurs and links them the solar lighting supplier. The entrepreneur is given a loan in kind and subsequently the MFIs pay the solar lighting products supplier directly. The entrepreneur then pays back the loan on monthly instalments to the MFI. In Kenya, this model is being applied by Kenya Women Finance Trust (KWFT) who works with SunTransfer as a solar lighting products supplier.

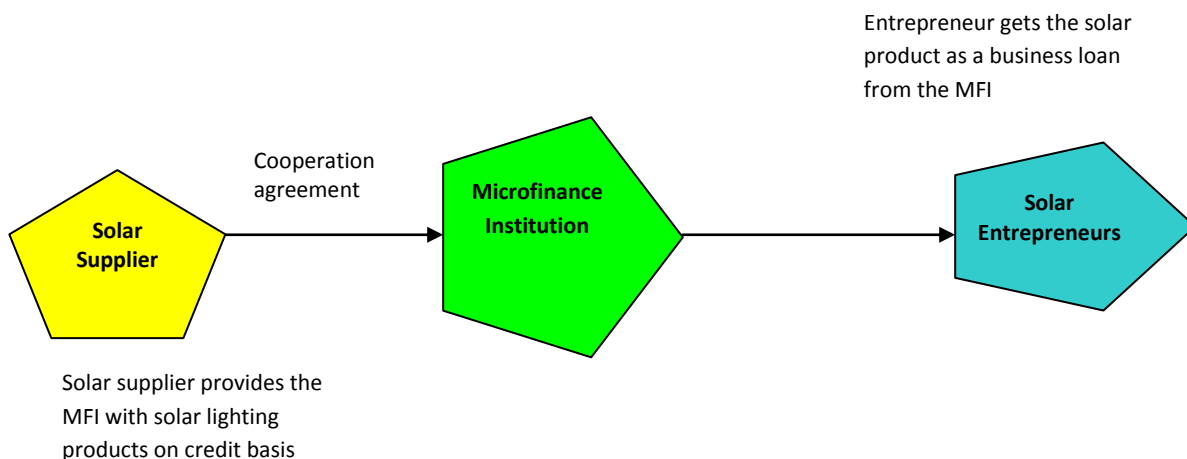


Fig 6: Enterprise financing through Microfinance institution

Gaps in the model

The entrepreneurs are locked to only to single suppliers working with MFI

Opportunity of the model in scaling solar for women

- It offers an opportunity to empower women in entrepreneurship as the products are directly linked to financing opportunities which is one of the key bottleneck to enterprise development;
- The MFI works on developing entrepreneurs who are directly in the supply chain. This model works with already established entrepreneurs making it possible for them to be capitalised.
- The model helps in reducing the operational cost involved supportive mechanisms such as mobilising, training and loan follow-ups

- Due to availability of business finance, the model can be used to bring on board women entrepreneurs to participate in solar lighting business.

2.2.2 Guarantor Model

This financing model works where a guarantor places a partial guarantee with a financial institution to facilitate the entrepreneurs' access loans for the purchase of solar lighting products. The guarantor conducts a due diligence on the financing institution before placing a guarantee. A solar supplier is identified to work with the financial institution. The role of the supplier is to provide solar products to the entrepreneur that includes: delivery, technical assistance and product warranties and any other services as agreed. The guarantor may require the financial institution to reduce interest rates because a partial guarantee covers a partial risk of default to the financial institution. In Kenya, this model has been applied by Global Village Energy Partnership (GVEP) International, an international NGO that works on energy access in Africa.

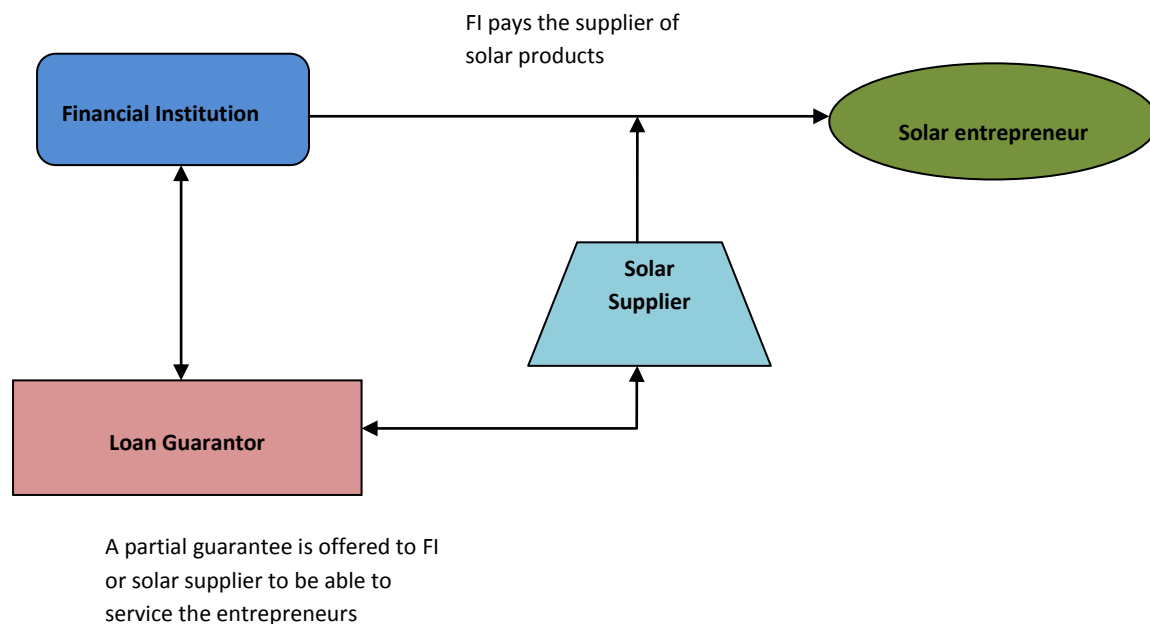


Fig 7: Loan guarantee model

Gaps in the model

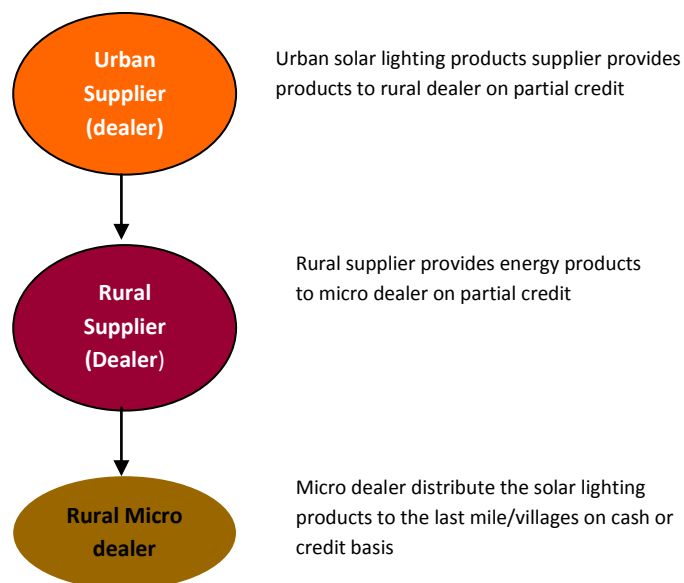
- The model works best where entrepreneurs are grouped other than individuals due to the guarantee that is placed with a financial institution.
- The model is new and most of the financial institutions have little or no knowledge on solar loan guarantee.

Opportunity of the model in scaling solar for women

- Solar entrepreneurs especially rural women dealers can benefit from such a model where they are linked to suppliers and financing institutions.
- This model can work with a variety of financing institutions from commercial bank to village banks. This makes it appropriate to engage women entrepreneurs to take advantage of the opportunity.

2.2.3 Dealer Model (Urban Rural Dealership)

In this model the urban energy suppliers (dealers) work with rural suppliers (dealers) who in turn work with rural micro dealers. The urban supplier may or may not provide partial credit to the rural dealer though this depends on personal relations with the latter. On the other hand, the micro dealer is well known to the rural dealer who provides partial credit usually 15 to 30 days. In Kenya, this model has been used by SCODE limited, a rural supplier based in Nakuru who sells products from an urban supplier called One Degree and firefly from Barefoot Power.



Gaps in the Fig 8a: Dealer model

- The model is risky as it is based on trust between the rural dealers and micro-dealers.
- The coverage of the model is limited as it depends mainly on entrepreneurs well known to the dealer;
- It has short credit period of between two weeks to one month.

Opportunity of the Model in scaling solar for women

- It has opportunity to work with village women groups as micro-dealers. This presents a potential for replication and scale-up due to many women groups at village level;

- A local financing institution can be introduced to bridge the business financing gap at two level: rural supplier level and micro dealer level.
- The model presents an opportunity to women who are running general shops due to their existing infrastructures in rural areas who can be linked to urban dealers.

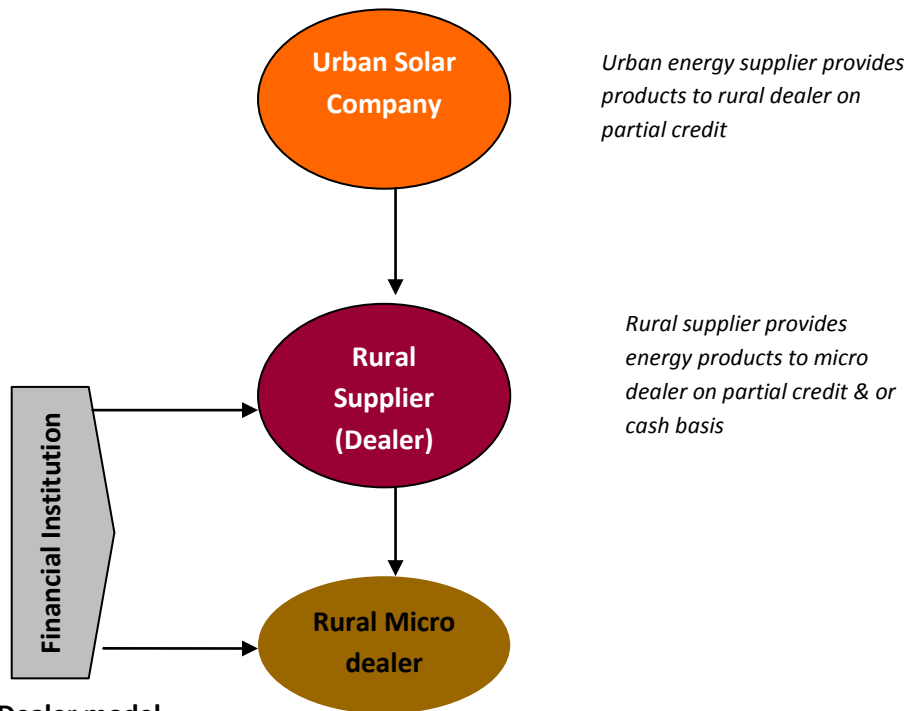
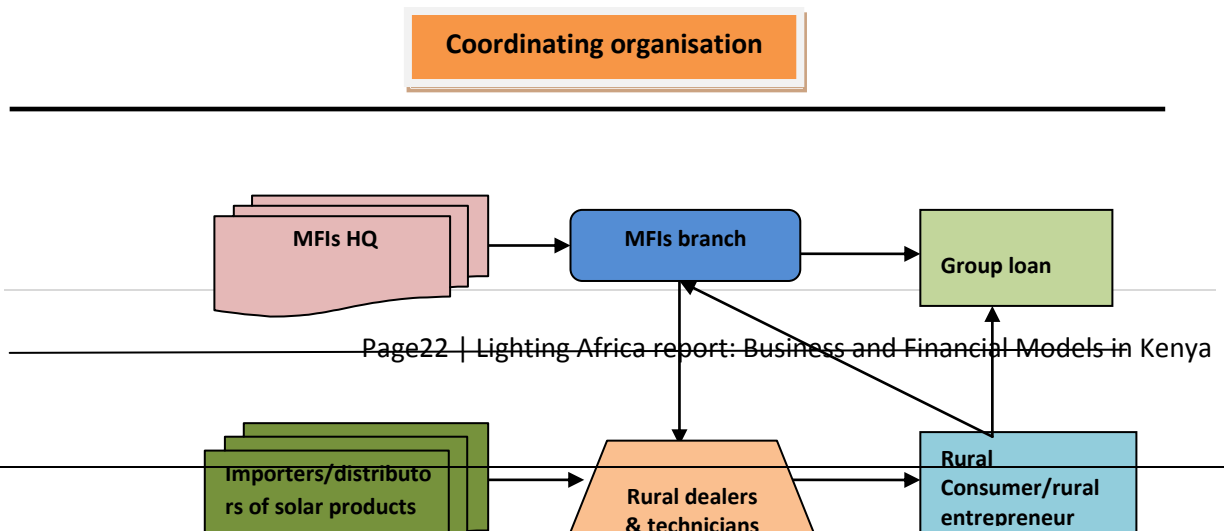


Fig 8b: Dealer model

2.2.4 Intervention Model for Rural Solar Market Development

The model works on two parallel levels: the rural energy supply chain and the MFI. It was developed by Triodos facet to partners with MFIs in East Africa. The model works with selected MFIs hand in hand with solar lighting distributors. MFIs are linked to solar lighting products suppliers by a coordinating organisation. The coordinating organisation ensures that the flow is seamless as well as matching the right solar product supplier with branches of the MFI they are working with. The model is being implemented by a consortium of partners; HIVOS, Triodos Bank and Integral Advisory Ltd, through a four year program funded by the European Union in East Africa.



MFI

Supply Chain

Fig 9: Intervention model

Gaps in the model

The model is in early inception stages of implementations and no lessons have been presented

Opportunity of the model in scaling solar for women

- This model can be replicated to incorporate SACCOs that support women groups

2.2.5 Cash Sale Model

The model works where a solar supplier identifies dealers who purchases from the supplier on purely cash basis. Most energy suppliers use this model to distribute their products.

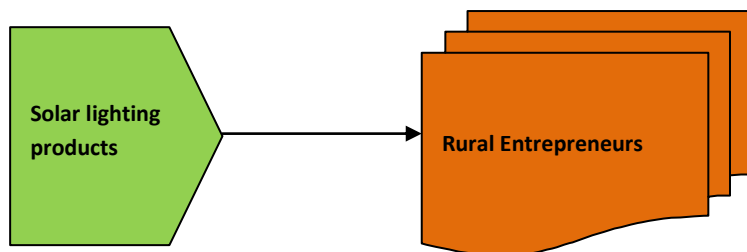


Fig 10: Cash sale model

Gaps in the model

It is limited because rural entrepreneurs may not have access to financing to their purchases

Opportunity of the model in scaling solar for women

- The model can be scaled up by mobilizing women who have electronic shops, mobile phone shops and hard ware shops in the rural areas;
- It can work with women groups that have cash but do not know where to buy quality solar products.

ⁱ International Energy Agency, World Energy Outlook (WEO), 2011

ⁱⁱ Chaurey, A., Kandpal, T.C. Solar lanterns for domestic lighting in India: Viability of central charging station model. Energy Policy (2009)

ⁱⁱⁱ <http://www.barefootpoweruganda.com/>

^{iv} The School Solar Lighting Project (SSLP). (2011)

<http://risekenya.org/index.php?page=news&subpage=news&gid=13>

^v Denis Gathanju, Kenyan Women Light Up Villages with Solar Power

<http://www.renewableenergyworld.com/rea/news/article/2010/07/kenyan-women-light-up-villages-with-solar-power>

^{vi} Sustainable Energy Fund initiated by Eight19 and Sunnymoney for off-grid communities in East Africa, 2012, [http://www.pv-](http://www.pv-tech.org/news/sustainable_energy_fund_initiated_by_eight19_and_sunnymoney_for_off_grid_co)

[tech.org/news/sustainable_energy_fund_initiated_by_eight19_and_sunnymoney_for_off_grid_co](http://www.pv-tech.org/news/sustainable_energy_fund_initiated_by_eight19_and_sunnymoney_for_off_grid_co)

^{vii} Massé, R. "EnPoGen Study in Sri Lanka," ENERGIA News vol. 5 nr 3 (2002).

^{viii} "Home - Enterprise Surveys - The World Bank Group", August 19, 2011,

<http://www.enterprisesurveys.org/>.

^{ix} Fulton, L., Howes, T. & Hardy, J. (2004), "Biofuels for Transport: An International perspective", International Energy Agency