# GIVING LIGHT IN RWANDA

**THE INNOVATIVE BUSINESS MODEL**
OF NURU ENERGY

**CATALYSING ENERGY ENTREPRENEURSHIP IN RURAL RWANDA**
RWA605

EEP
ENERGY AND ENVIRONMENT PARTNERSHIP / SOUTHERN AND EAST AFRICA

Customer working with a LED light.

## Nuru Energy (“Nuru”) provides Rwanda’s rural households with access to sustainable, off-grid energy solutions.

Realising the need for affordable energy solutions, Nuru energy developed an off-grid solution specifically tailored for households living below the poverty line. Nuru’s business model provides not only access to affordable energy, but also a platform to develop rural entrepreneurship.

## Rwanda's installed electricity capacity falls far short from supplying the population and the existing grid covers a limited area.

*"Grid connection fees and per unit costs are relatively high."*

For example, only 19.8%[1] of the population has access to electricity. Grid connection fees and per unit costs are relatively high.  A large share of the population have a limited income, Rwanda's poverty headcount ratio for 2013 shows that 60.4% of the population live on less than $1.90 a day  and based on Nuru's field research, 80 % of their customers earns less than $1.50 a day[2] and of them 20 % earns less than $0.50 a day.

The combination of low income households, limited (high cost) electricity supply and a limited grid network requires an alternative approach to give rural communities access to electricity. This is especially true for the market segments that include the poorest, lowest income, communities. The household's primarily need for energy is for lighting, charging mobile phones and powering radios.

[1] UNDP, 2014
[2] World Bank, 2013



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# Nuru Energy's work in Rwanda dates back to 2009.

The initial entry considered the prevailing market conditions that where highlighted in earlier research, for example a study by the World Bank found that the majority of households earning less than €1.50 focused on kerosene to meet their energy needs for lighting.

Nuru did field work in Rwanda and learned that the use of kerosene could be attributed to portability, reliability and the option to purchase it in small increments, removing the need to purchase large quantities which these households cannot afford.

However, some of these very poor households ended up spending over 25% of their income on kerosene.

Whilst kerosene allowed for incremental purchases to generate light, it can be unsafe, cumulatively expensive and unfriendly to the environment. Other technology options, such as solar lamps and home Solar Home System (SHS), require the payment of upfront costs, which creates a barrier for rural households with limited incomes. The upfront costs could range from a low of $5 to $10 for the cheapest option solar lamps, to $25 for a system with a lamp and a possibility to charge a mobile phone, and up to and exceeding $100 for SHS.

*"Other technology options, such as solar lamps and Solar Home System (SHS), require the payment of upfront costs, which creates a barrier for rural households with limited incomes. "*

Family working with LED lights.

Accordingly, Nuru specifically targets the poorest household groups and it forms a key part of their social motivation to do business in these communities.

These very poor households can be categorised into two categories: **1)** families who do not own a house and can hardly afford basic necessities and **2)** those who are renting or have a house of their own but rarely a full time job.

Nuru Energy's growth path has not however, been a linear scale-up. More recent research revealed a shift in kerosene consumption for lighting under the poorest households.

As the availability of cheap flashlights have spread, these households have started to substitute flashlights for kerosene lamps and in some districts the use of kerosene for light has been removed completely. The flashlights are generally cheap and of a poor quality. It costs no more than $0.50 upfront and roughly $0.50 per month to replace the disposable batteries that will end up in local landfills and potentially pollute the environment.

# Nuru Energy's product offering

Considering the attributes that initially made kerosene and currently make flashlights an option for the poorest households, Nuru Energy's business model provides a new, environmentally safe alternative. The product offering involves four key components:

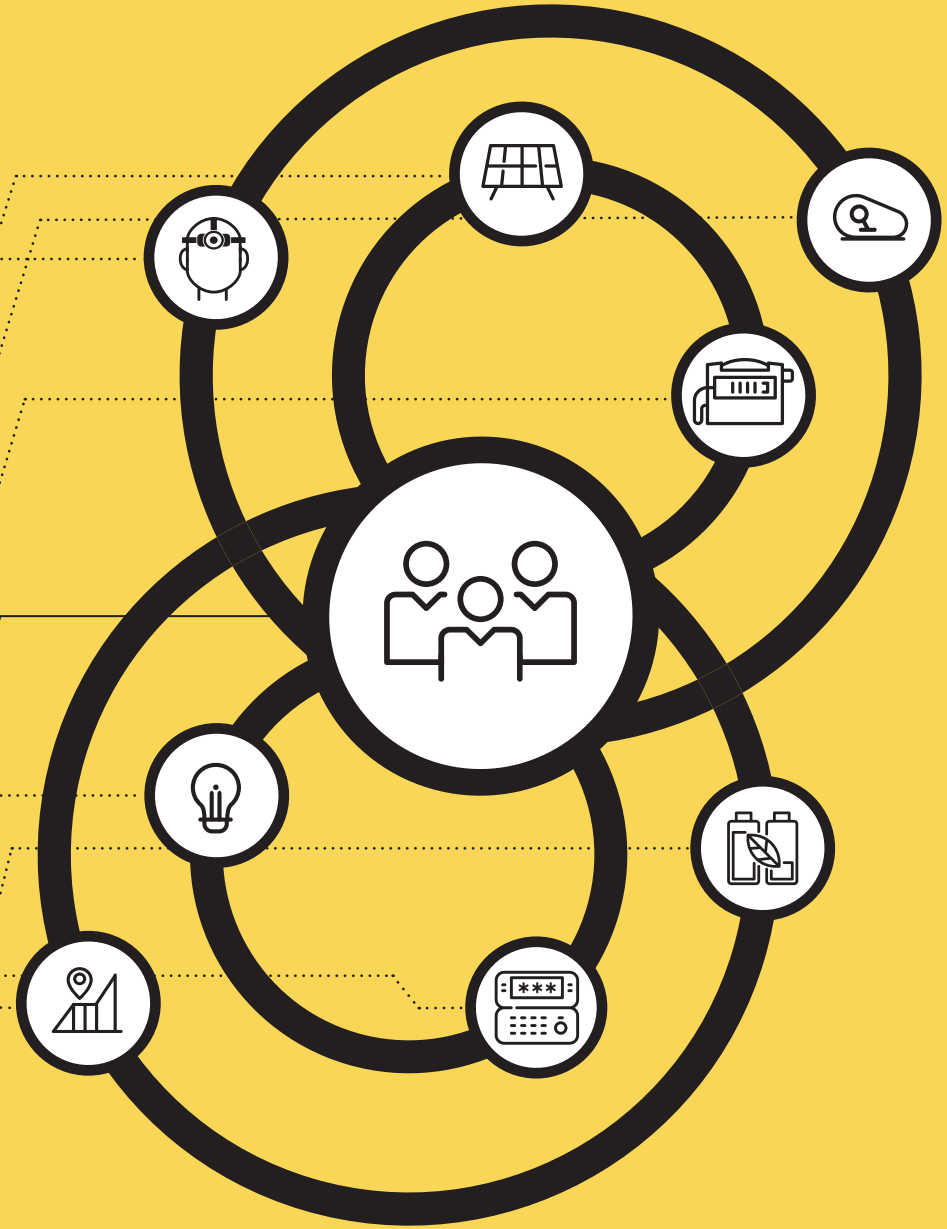
1 Nuru LED task lights
2 Nuru's 60W solar panel
3 The Nuru POWERCycle pedal generator
4 The Octopus Charger

Using these four components, the product offering involves four other key innovative mechanisms:

5 An affordable recargable LED task lights (NLs)
6 An innovative charging method
7 An opportunity for village-level entrepreneurs
8 An Energy credit/activation code system

◯ Community engagement

A ninth element can be added in terms of community engagement. The model involves the community as a whole, as almost all members of the community get connected. Therefore, it is a highly social model which brings the community together whilst meeting at the charging point. It provides a similar social dynamic to the social gathering of water and wood.



*"To make the LEDs more affordable, Nuru Energy do not rely on the upfront sales margin, but rather on a portion of the LED recharging fee."*

Households can start by purchasing a rechargeable LED task light and add additional lights according to their needs. Nuru also offers even more functional, rechargeable task lights that also incorporate a room (ambient) light and/or mobile phone recharging.

For a small fee of 100 RWF (approx. 0,12 EUR), households can recharge their LED lights. To make the LEDs more affordable, Nuru Energy do not rely on the upfront sales margin, but rather on a portion of the LED recharging fee. The concept developed from the similar applications in telecoms and collaborative consumption businesses, such as Netflix. Rather than depending on revenues generated directly from infrastructure (the LED lights), revenue is generated from the use of the service, in this case the off-grid recharging service.



Customer working with a LED light.

VLE charging
3 LED lights using
the POWERCycle.

# Village level entrepreneurs [VLEs] use Nuru Energy's 60W solar panel to provide recharging services.

On rainy days with limited sunshine, VLEs can use Nuru's PowerCycle, a pedal generator that is operated like a stationary bicycle, to recharge the consumers' LED lights.

*"The VLEs own and operate their solar panel/ POWERCycles as standalone, centrally located, recharge stations."*

*"The Octopus Charger can take solar energy inputs (solar panel), human energy inputs (POWERCycle) or grid energy (mains adapter)."*

The PowerCycle is simple to operate and can recharge either 5 Nuru LED lights (lasting up to 18 hours or 1 week) or up to 5 other USB devices, such as mobile phones. The VLEs own and operate their solar panel/POWERCycles as standalone, centrally located, recharge stations.

Nuru's Octopus Charger forms the link between the LED lights and the charging mechanisms, i.e. the 60W solar panel and the POWERCycle. The Octopus Charger can take solar energy inputs (solar panel), human energy inputs (POWERCycle) or grid energy (mains adapter).

The three charging mechanisms provide electricity to the Octopus Charger which can then charge Nuru LED lights, mobile phones and other USB devices.

Furthermore, the Octopus Charger can serve as an energy storage device for VLEs to recharge devices at other locations without having to take along the solar panel or POWERCycle.

VLE charging 5 LED lights and 2 cell phones using the POWERClycle and a solar panel.

VLE generating energy
with the POWERCycle.

*"By understanding the needs of the poorest households, Nuru do not require a high upfront investment from consumers, but rather focuses on earning revenue through the incremental recharges that are more affordable for households."*

## Nuru's energy credit/ activation code system is a further innovation.

VLEs use a local money network to purchase "energy credits" or "activation codes" which they enter on the Octopus Charger keypad to unlock the Octopus Charger for them to provide recharging services. This allows VLEs to recharge a number devices equal to the "top-up" energy credit they have purchased. Herein lies Nuru Energy's innovative business model. By understanding the needs of the poorest households, Nuru do not require a high upfront investment from consumers, but rather focuses on earning revenue through the incremental recharges that are more affordable for households.

## In addition, VLEs have the opportunity to earn an income and improve their standard of living.

VLEs are set up as solidarity groups, where people work together as a group to operate their business instead of being single entrepreneurs.



Customer working with a LED light.

The Nuru Energy business model is successful because it considers the local conditions and needs of the poorest households for whom they wanted to provide access to off-grid power solutions.

By studying the characteristics of kerosene or flashlights for light consumption and leveraging off the examples from telecoms and collaborative consumption businesses, Nuru Energy can offer affordable LED lights to lowest income consumers and opportunities for VLEs to grow their own business whilst Nuru can generate revenue through the energy credit system.

Nuru Energy has by today successfully set up over 700 village-level entrepreneurs with an off-grid recharging platform, that serves over 800 villages (as one entrepreneur can provide services to more than one village), and has distributed close to 100,000 LED lights.

The Nuru Energy business model can create a significant impact by reaching the poorest people and whilst creating a viable business at local village level and on a commercial scale.

*"Nuru Energy can offer affordable LED lights to lowest income consumers and opportunities for VLEs to grow their own business whilst Nuru can generate revenue through the energy credit system."*

Published by EEP S&EA

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This material has been funded by the Governments of Finland, the UK, and Austria. The views expressed do not necessarily reflect the donor governments' official policies.

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The EEP S&EA programme is funded by:




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