

Case study summary

Rural Energy Foundation (REF), Sub-Saharan Africa

REF is developing and strengthening the solar energy supply chain in a number of sub-Saharan countries, creating jobs and access to electricity for thousands of rural households.

More than 70% of sub-Saharan Africa has no access to electricity, and in rural areas this generally exceeds 95%. REF has helped to facilitate access to solar-powered electricity in sub-Saharan Africa, by training and supporting rural retailers.

- REF promotes solar home systems (typically 11 to 50 Wp) and solar lanterns (1-10 Wp).
- It identifies retailers and distributors, trains them in solar energy technology, marketing, sales and business administration, and helps them start up and expand businesses selling solar energy products.
- Local technicians also trained to assemble and install the solar systems.
- Trained retailers who commit to growing a rural solar business and meet REF quality standards may use the SolarNow brand name, and benefit from SolarNow promotional activities undertaken by REF.
- 200 SolarNow retailers currently working in Burkina Faso, Ethiopia, Ghana, Mali, Tanzania, Uganda, Senegal, Mozambique and Zambia.
- Over 57,000 solar home systems (costing between US\$250 and 630) and 36,000 solar lanterns (US\$25 to 90) sold to date.
- Cost of system paid back in typically one to three years through savings in kerosene and batteries.
- Kerosene saving of typically one litre/week per household is saving 4.9 million litres/year and cutting CO₂ emissions by approximately 12,000 tonnes/year in total.
- Better quality light gives opportunities for study, income-generation and leisure activities. Electricity for radios and mobile phones improves communications and access to information.
- Businesses of the 200 SolarNow retailers have grown, and provided employment for about 200 local technicians.
- The REF approach to increasing access to electricity in rural areas is low-cost: REF operations represent only about 5% of the value of SolarNow sales.

REF is a not-for-profit organisation based in the Netherlands. Its main purpose is to increase the availability and use of solar electricity in rural Africa by strengthening supply chains. In 2009 it employed 32 staff and had an income of approximately US\$700,000. Its work is mainly funded by Dutch lottery and government funds.

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Uganda statistics 2006/7

(UNDP/WRI)

GDP: US\$267/year per person

CO₂ emission: 0.09 tonnes/year per person

75.6% of people live on less than US\$2/day

92% of people lack grid electricity

Location



"I used to repair and sell TVs and DVDs, but now I've had the training, about half my business is in solar installations."

Stephen Meana, energy shop owner, Mbale



At a Mbale Solar Now shop - Stephen Meana demonstrates lamps to potential customer.

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Case study

Rural Energy Foundation (REF), the Netherlands

Background

More than 70% of people in sub-Saharan Africa have no access to electricity. In rural areas this generally exceeds 95% and people spend much of their income on kerosene and candles for lighting, and batteries for small appliances. Solar photovoltaics (PV) can provide the small amounts of off-grid electricity needed for these and other needs, but many people are not aware of the benefits of solar PV or do not have sufficient money to buy solar products. Added to this, rural entrepreneurs lack the technical, commercial and financial capacity to start or grow a business in solar systems.

The Rural Energy Foundation (REF) recognised the crucial role that local solar entrepreneurs play in making PV electricity available to the people who would most benefit from it. It has helped to establish effective supply chains in sub-Saharan Africa through training PV entrepreneurs and technicians, stimulating demand, and facilitating access to loans for entrepreneurs and their customers.

The organisation

REF is a not-for-profit organisation based in the Netherlands, and has been running the SolarNow programme since 2007. It identifies retailers and distributors, trains them in solar energy technology, marketing, sales and business administration, and helps them start up and expand businesses selling solar energy products. Entrepreneurs who complete training, meet the REF quality requirements, and sign an agreement that they intend to develop a rural solar business are allowed to use the 'SolarNow' branding. This improves their visibility enabling them to benefit from large-scale SolarNow awareness campaigns.

REF has a Country Coordinator and a small team of local staff in each of the nine countries in sub-Saharan Africa where it currently operates: Burkina Faso, Ethiopia, Ghana, Mali, Tanzania, Uganda, Senegal, Mozambique and Zambia. There are a total of 32 employees.

In 2009 REF had an income of approximately US\$700,000. To date REF has been grant-funded by the Dutch lottery (DOEN Foundation) and the Dutch Ministry of Foreign Affairs, as well as several individuals and Foundations. The medium term objective is for REF local offices to become more self-financing through providing consultancy and other services.

REF does not charge for its services, but monitors its operating costs in relation to the value of the sales made by SolarNow retailers. In 2009, the REF operating cost was only about 5% of the value of sales. This shows that supporting supply chain development can be a very cost-effective way of providing access to PV electricity.

The technology

How does it work?

REF primarily works with solar home systems (SHS) and solar lanterns.

An SHS consists of a PV module, which generates electricity from sunlight; a rechargeable battery, which stores electricity so that it can be used during both day and night; a charge controller, which prevents the battery from being over-charged or deep-discharged; lamps; wiring and fixtures. The SHS promoted by REF use PV modules from 11 to 50 Wp rating. Depending on size, systems can support other small electrical appliances like mobile phone chargers, radios, fans or black and white TV.

A solar lantern has the lamp and battery combined in one portable unit. The 1 to 10 Wp PV module is sometimes incorporated in the unit, but is often detachable.

The technology in more detail

PV modules should last for 20 years, although SHS components such as the batteries and controllers need replacing more often. Solar lanterns have a variable life: smaller cheaper ones last two or three years, while the high quality, more expensive ones are expected to last 5-10 years.

SolarNow retailers and importers are free to source the components for the systems which they sell from brands they like, as long as the end product is good quality. REF has quality checks in place to assure this. The PV modules should be durable and should preferably have at least five years' warranty, and the battery and lamps should be replaceable.

REF keeps up-to-date with equipment testing programmes that are carried out by organisations such as the World Bank, and can thus advise retailers.



Demonstrating a D.Light 'Kiran' solar lamp to villagers, Moroto road

“You can start with the lanterns: they’re cheap, and it only takes around minutes to sell one to the customer. Then when they’ve got a taste for solar, they want more power, so then you can sell them a small solar home system.”

Gildo Ongom, in training as Solar Now retailer, Moroto, Karamoja.

How much does it cost and how do users pay?

REF does not specify prices, but gives general guidance to SolarNow retailers. As a starting point, they suggest that a 11–20 Wp SHS should sell for about US\$250–440 and a 21–50 Wp SHS for US\$360–630. The solar lanterns sell for US\$25–90, depending on size and quality. REF encourages retailers to learn about the market and understand what is affordable for their customers.

The customers pay the full price for the system, usually up front in cash. SHS are increasingly made to be easily expandable, so that users can start with a small system and increase the size when they can afford to.

REF encourages micro finance institutions (MFIs) to make finance available for customers to buy solar products. REF has a guarantee fund to stimulate loans to potential customers and entrepreneurs. Four financial institutions are taking part in a pilot project whereby REF guarantees 50% of the repayment of the customer and retailer loans. The customers typically repay these loans in 12 to 24 monthly instalments. The pilot projects are taking place in Tanzania, Uganda and Burkina Faso for retailers and micro-entrepreneurs and in Uganda, Ghana, Mali and Burkina Faso for customers of solar products.

How is it manufactured, promoted and maintained?

PV modules and charge controllers for the products sold by SolarNow retailers and importers are manufactured in China, USA and Europe. The systems are assembled and installed by local technicians trained by REF. Batteries are often manufactured locally. REF does not mandate any particular brand, although they do advise retailers on the best options. If a retailer repeatedly sells poor quality products, they can lose their SolarNow status. REF feeds back information to importers as a way of trying to improve the quality.

REF gives retailers and technicians a four day training course on the technology, marketing and sales aspects of their work. There is also informal training through regular visits by REF staff and technicians to check their work, demonstrate new products and talk through any problems. All technicians contracted by SolarNow retailers are eligible for REF training.

Retailers market the products through live demonstrations using a demonstration kit. Retailers can borrow this kit from REF for three months to test its effectiveness, and then return or buy it. REF is also starting to design specific kits (based on discussions with retailers), which could be used to start up solar-powered businesses. For example, there is a bush barbershop kit and a mobile phone charging kit, and REF is currently even designing an off-grid internet café kit.

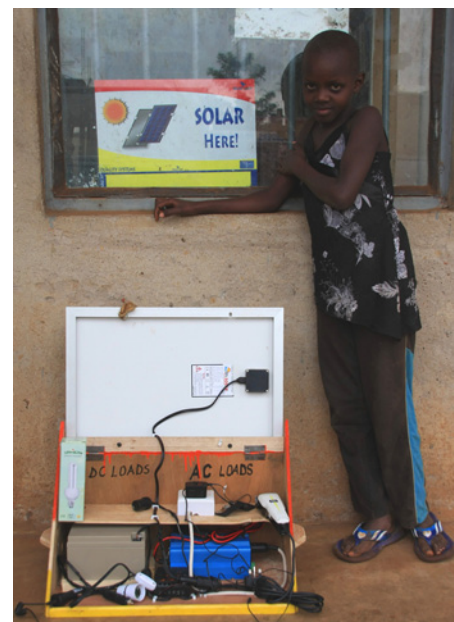
REF-supported shops are branded in the SolarNow colours, including banners and posters. By making the brand SolarNow more visible, REF can promote it, benefitting retailers and importers.

REF initiates large-scale marketing campaigns to raise awareness of solar products. Further up the supply chain, REF works on making importers aware of the potential of the retail market and then helps link them up to retailers.

REF encourages retailers to not only provide proper warranty, but also to offer after sales services via a service contract. These contracts include one or two visits from a technician and an interim phone call. Customers get initial advice and a simple instruction sheet to use as a reference.

Benefits

Since 2007, retailers of SolarNow products have sold over 57,000 solar home systems and 36,000 solar lanterns. With four or five people per household, this means that REF has helped over 455,000 people gain access to electricity. There are over 200 SolarNow retailers operating in nine African countries, and a similar number of technicians contracted to install and service systems.



Demonstration kit at a Solar Now retailer, Tororo

“The best form of marketing is to show people how solar works. So they can see that it’s charging their mobile; they can see the TV’s switched on. Then they really feel solar works!”

Gildo Ongom, in training as Solar Now retailer, Moroto, Karamoja.



Training prospective Solar Now retailers, Moroto.

Environmental benefits

Replacing the use of kerosene cuts greenhouse gas emissions. REF estimates that the average household using a solar lantern or SHS saves about one litre of kerosene per week. This represents a reduction of about 0.13 tonnes/year of CO₂ emissions. The systems sold to date are therefore reducing use of kerosene by 4.9 million litres a year and cutting emissions by about 12,000 tonnes/year CO₂.

Replacing kerosene lamps and candles with solar energy also improves air quality in households and reduces fire risks.

Social benefits

PV electricity improves the quality of life in rural areas. People have better access to communication and information through radio and mobile phones. Children are able to study in the evening with better quality light, and light allows people to spend more time on both income-generating and leisure activities. Improving quality of life in poor, rural areas can reduce migration to often over-populated urban centres.

Economic and employment benefits

The use of PV for lighting is cheaper in the long term than kerosene and batteries. REF estimates that an average household saves 30% on its energy expenses, and that the payback period for a SolarNow system is only one to three years, after which replacement costs are low.

Selling PV systems has increased business for the 200 SolarNow retailers. It has also brought employment for about 200 local technicians, since on average each retailer employs one full-time technician to assemble and install systems. Selling and servicing SolarNow products gives retailers increased visibility, more security and a better chance of accessing lines of credit.

Potential for growth and replication

Despite the success of SolarNow, there are still millions of people in Africa without electricity, and many see no prospect of getting it in their lifetime. However, there are many rural entrepreneurs that could become SolarNow retailers in the future.

REF wants to expand its operations to work in more countries in Africa. It is increasing its range of solar PV products, and also running pilot schemes with other renewable energy technologies, including pico hydro systems and efficient stoves. Increasing the availability of both retailer and customer finance is a major area which REF seeks to expand.

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This report is based on information provided to the Ashden Awards judges by the Rural Energy Foundation, and findings from visits by members of the judging team to see its work in Uganda.

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Solar 'power station' at a retailers in Tororo.

"REF trained me in solar technologies, marketing skills and so on... Some people come to the shop because they know me; others see the Solar Now signs in the window and come in... Otherwise it's all about going out to markets and making people aware of us."

Floyd Owori, energy shop owner, Tororo



Training prospective Solar Now retailers, Moroto.

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