



Which systems will foster sustainable access to energy in Uganda: Grid or solar?

Overview

Energy is vital for economic growth and development of a country, thus its limited access is a key development challenge. In Uganda where only 14.9% of the households have access to electricity, the Government of Uganda (GoU) responded to this development challenge, by securing funding for the Promotion of Renewable Energy and Efficiency Programme (PREEP) from the Germany Agency for International Cooperation (GIZ) in 2008. The main objective of the programme is to improve supply of energy from renewable sources by increasing the total available power generation capacity in the country and reducing the frequency of load shedding.

To date, rural household's access to electricity of 6.9% has been achieved through PREEP, Energy for Rural Transformation, and Rural Electrification among other interventions. The access rate is however still low compared to the rural access target of 22% by 2022. The Budget Monitoring and Accountability Unit (BMAU) field monitoring for Q2 FY2013/14, however indicate differences in sustainability of the different interventions. Whereas grid connections can sustain the intervention's benefits, simple solar home systems have short-lived benefits due to constant breakdowns. A shift of focus from less sustainable to more sustainable implementation of energy projects is important in enhancing access to energy.

Using evidence from the BMAU monitoring activities for Q2 FY2013/14, this paper compares the PREEP's grid extension and the solar home systems components in light of: a) Financial contributions from the beneficiaries against the market cost price. b) Benefits and challenges c) Sustainability of the interventions, and proposes policy recommendations.

Key Messages

- (i) The market price of access to grid connections and a typical solar home system is still high.
- (ii) Subsidies are vital in accelerating access to energy. The more the subsidy the higher the number of beneficiaries.
- (iii) Grid extension is more sustainable compared to the solar home systems given its ability to support all types of power equipments.
- (iv) Solar energy is effective in remote areas without access to grid power but should be of adequate capacity to allow multiple uses.

Introduction

In Uganda, the Energizing Development (EnDev) under PREEP seeks to enhance access to modern energy services, especially among rural households, social institutions, and small and medium enterprises. This is through supporting the provision of modern energy for lighting and powering electric household appliances, cooking, social infrastructure, among other uses.

Implementation of the programme is in three phases; Phase I (2008-2011) was allocated Euros 6 million; Phase II (2011-2013) at Euros 6 million, and Phase III (June 2013-2016) at Euros 7 million.

Summary of implementation

Grid extension has so far been implemented in Lango, and Teso regions while solar home systems, implementation is in the Central, South-Western, and West-Nile regions of the country. By December, 2013, a total of 206 beneficiaries had received grid connections while 263 had received solar home systems both at a subsidized cost. This was aimed at enhancing access to energy for the rural households. Some beneficiaries for the grid extension project had started value addition businesses while the solar home systems beneficiaries were using the equipment for lighting.

Implementation of selected interventions

1. PREEP grid extension component;

this is a community initiative implemented in collaboration with Rural Electrification Agency (REA), UMEME and Ministry of Energy and Mineral Development (MEMD). Implementation of the pilot phase began in October 2013 in Lango and Teso subregions.

The intervention targeted communities with more than 120 households. The households expressed interest and willingness to contribute towards project.

The REA covers full cost for the High Voltage (HV) network and the required transformers; and contributes 70% of total cost for the Low Voltage (LV) network.

The community contributes 30% of total cost for the LV network. However under this arrangement, GIZ and the community contribute 15% each. In addition the households are required to wire their structures and pay for auxiliary items like sockets, plugs and switches among others.

2. Solar home systems

EnDev Uganda seeks to develop the solar market in order to boost access to energy. Under this initiative, support is given to solar equipment dealers who are encouraged to become certified suppliers of high quality solar equipment. The dealers benefit from promotional and marketing support, as well as technical and business skills trainings.

The Barefoot Limited, a company that distributes solar lighting and charging systems was contracted in April 2013 to install the home solar systems at a cost of Ug shs 30 million in Arua district. The contract involved provision of a fully installed solar Photo Voltaic (PV) system that provides a minimum of eight hours lighting time. The system included solar panels, four bulbs for ordinary domestic use and batteries.

Comparisons between grid extension and solar systems.

a) Required contributions

Under the grid extension component the households contributed Ug shs 150,000 while the schools contributed up to a maximum of Ug shs 3,000,000. The GIZ on the other hand paid the difference ranging between Ug shs 510,750 and Ug shs 5,000,000 including inspection fees and service connection fees for the grid extension and connection.

The fees depended on the distance of the beneficiary from the grid. Comparatively, the households contributed Ug shs 35,000 for the solar home systems while GIZ contributed Ug shs 310,000.

The open market contributions are higher than the beneficiary contributions under the two GIZ interventions (table 1). The difference is Ug shs 262,000 under the grid extension project and Ug shs 253,065 for the solar home systems.

It was noted that the lower the required co-funding, the higher the programme uptake. The solar home systems had more beneficiaries compared to the grid extension component.

This means that project subsidies are instrumental in enhancing access to clean energy interventions especially among the rural poor.

Table 1: Beneficiary Contributions and Open Market Contributions

Intervention	Beneficiary Contributions	Average Open Market cost price
Grid Extension	150,000	412,000 ²
Solar Home Systems	35,000	288,065

Source: Field Findings



L-R: solar home system; and solar light on a hut

b) Benefits

The solar home system component had more beneficiaries in the different villages than the grid extension (table 2). There were more solar home system beneficiaries than those of grid extension partly due to the difference in the required contributions. The Solar system was however limited to homesteads which used them for lighting purposes. The grid extension component on the other hand befitted homesteads, commercial, and social institutions.

Table 2: Number of Beneficiaries of Grid Extension and Solar Home Systems.

District	Grid extension		Solar home systems			
	Kole	Soroti	Arua			
Village/Trading centre	Konapak	Amen	Okabi	Lama	Eyire	Liri
Households	73	89	117	71	30	45
Social institutions	6	11	0	0	0	0
Commercial customers	0	27	0	0	0	0
Subtotal	79	127	117	71	30	45
Grand total by intervention		206				263

Source: Field Finding

The GIZ trained grid extension beneficiaries and the entire community on productive use of energy resources. The training entailed skills for opening up small scale enterprises like welding

workshops, bars and shops among others. Similarly solar home system beneficiaries were trained on use and maintenance of the systems.

Benefits from both Interventions:

- (i) Improvement in clean lighting in households; class rooms and dormitories for the schools.
- (ii) General improvement of security at the households and school premises.
- (iii) Reduction in fuel expenditure
- (iv) Increased school enrolment resulting from permanent settlements.
- (v) Improved community welfare; this was evidenced by new infrastructure and clean roofs.

Unique benefits from grid extension

- (i) Ability to power heavy equipment like, refrigerators and agro processing equipment.
- (ii) Increased sales due to extended business hours for the shops and the mini-bars. This translated into better incomes.

Challenges for grid extension

- High power tariffs.
- Long distances to UMEME regional offices. For example they were located in Lira district for the Lango region.
- UMEME delayed response to power breakdowns.

Unique benefits from the solar home systems

- (i) Reliability of lighting systems as its not affected by load shedding
- (ii) Flexibility of solar home systems that made installations in remote areas possible.

Challenges with the solar home systems

- a) Theft of solar systems. For example the Okabi community in Arua district, had experienced 11 cases by December, 2013.

- b) System breakdowns; this is in part due to misuse of systems where beneficiaries wired the systems on more than one infrastructure.

Generally the grid extension and solar home systems interventions are vital in enhancing access to clean energy and the beneficiaries were happy with both interventions. The unique benefits that accrued to grid extension can promote use of value addition equipment and other productive enterprises compared to solar home systems which faced frequent breakdowns.

- c) Sustainability of the interventions:

The solar home system is the best viable solution for the most remote areas; but challenges of its constant breakdown pose sustainability issues.

Grid extension is a good alternative towards enhancing access to clean energy for both households and small businesses. Upon connection to grid power, households, and businesses are able to operate any type of power driven equipment.

This stimulates business development. All the beneficiaries noted that whereas power bills were relatively high, they were manageable given the accrued benefits.

This is a reassurance of their ability to meet the power bills in spite of the high cost. Thus the grid extension was a sustainable intervention.

CONCLUSION

Enhancing access through subsidies to modern energy services especially among the rural poor is vital for economic growth and development. Solar home systems are a good intervention in enabling access to clean energy in remote areas. It is however affected by systems breakdowns.

Access to grid power can enhance establishment of cottage industries as opposed to the solar home systems. The high cost of grid extension and connections however remains a major challenge especially among the rural poor.

RECOMMENDATIONS

The REA should roll out the grid extension project across the country. This will facilitate achievement of the rural access target.

The REA should fast track energy connection subsidies across the country.

The MEMD should extend solar home systems with a stronger capacity to the remote areas to improve lighting.

The MEMD should institute maintenance mechanisms of the solar home systems to ensure sustainability of the intervention.

References:

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Budget Monitoring and Accountability Unity
Ministry of Finance, Planning
and Economic Development,
Plot 2-12 Apollo Kaggwa Road, P.O.Box 8147
Kampala,
www.finance.go.ug