



# The Experience in Uganda on Mini-Grids for Rural Electrification

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by

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# INTRODUCTION – MINI-GRIDS FOR RURAL ELECTRIFICATION

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- In Uganda the basis for the development of a mini-grid system in an area is serving isolated communities with a relatively concentrated population that has a potential for productive uses of electricity.



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## THE EXPERIENCE ON MINI-GRIDS FOR RURAL ELECTRIFICATION (CASE STUDIES)

● There are 4 geographical locations in Uganda where the mini-grid system has been implemented so far.

● **West Nile Region** – Had an existing mini-grid system powered by a diesel generator, which was owned by the electricity parastatal that was in existence at that time.



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## **THE EXPERIENCE ON MINI-GRIDS FOR RURAL ELECTRIFICATION (CASE STUDIES)**

● In 2003, under a concession the West Nile mini-grid system was transferred to a private company (WENRECo), to operate and maintain.

● This private company had the obligation of improving the existing mini-grid system and to distribute power in the interim using a 1.5MW HFO generator, which was purchased by way of a subsidy from the Government.

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## **THE EXPERIENCE ON MINI-GRIDS FOR RURAL ELECTRIFICATION (CASE STUDIES)**

● In the long term, the private company was to develop and switch to a 3.5MW mini hydro dam, using debt financing, a subsidy from Government and equity.

### Challenges

● High cost of fuel, trigger for few hours of power supply per day and at times there was no supply at all.



## **THE EXPERIENCE ON MINI-GRIDS FOR RURAL ELECTRIFICATION (CASE STUDIES)**

● Delay in the construction of the mini hydro dam, resulted into a cost over run – prices of construction materials like steel and cement went up.

### Solutions

- Fuel subsidy was given by Government to the operator.
- More financing by way of a grant from KFW to cover the cost over run for the dam to be





## **THE EXPERIENCE ON MINI-GRIDS FOR RURAL ELECTRIFICATION (CASE STUDIES)**

completed and for the mini-grid to be extended to capture more load centers.

### Outcome

- The mini hydro dam was commissioned in Sept 2012 and supply of power is 24 hours per day.
- The number of connections stands at 3173 consumers.



## **THE EXPERIENCE ON MINI-GRIDS FOR RURAL ELECTRIFICATION (CASE STUDIES)**

● Kalangala an island in Lake Victoria – In 2006 a 250kVA diesel mini-grid system was constructed by the Government and leased to a private company as the operator.

### Major Challenge

● The cost of fuel was so high for the operator against the tariff, it operated the system for only a year because it could not recover the costs of operation.





## **THE EXPERIENCE ON MINI-GRIDS FOR RURAL ELECTRIFICATION (CASE STUDIES)**

### Solutions

- In the short term it is operating under management and operation agreement (Government distribution entity) – REA paying all the attendant costs.
- In the long term – a submarine cable is under design. The island is to be connected to the main grid.

### Outcome

The consumers connections stand at 282.



## **THE EXPERIENCE ON MINI-GRIDS FOR RURAL ELECTRIFICATION (CASE STUDIES)**

● Ngoma a pastoral community – In 2006 a 65kVA diesel mini-grid system was constructed by the Government and leased to a private company as the operator.

### Challenges

- The cost of fuel was so high, the company failed to continue operations.
- The load became greater than the generator capacity.



## **THE EXPERIENCE ON MINI-GRIDS FOR RURAL ELECTRIFICATION (CASE STUDIES)**

### **Solutions**

- The main grid has recently been extended to this area.
- The community is to be connected to the main grid as one large consumer of the distribution company paying one bill. The distributor shall technically be in charge of the network while the community shall handle the commercial aspects like collection of bills.



## **THE EXPERIENCE ON MINI-GRIDS FOR RURAL ELECTRIFICATION (CASE STUDIES)**

### Outcome

The consumers connections are 120.

- Kisiizi Hospital in Western Uganda – Initially the hospital had a 60KW hydro system for it own use. Under RE the Government gave a subsidy to the hospital for the construction of a 374KW hydro mini-grid system.

- This system has been a success and it has 304 connections. The challenge that is coming up is – operations are getting to full capacity and



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yet they have about 100 new consumer applications .

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## **COMMON CHALLENGES FACED DURING THE IMPLEMENTATION OF MINI-GRIDS**

- The high cost of fuel.
- Supply of power has been erratic – few hours per day.
- The level of connections by consumers has been so low.
- Under utilization of the generating sets – full capacity not used .





## **GENERAL SOLUTIONS TO THE MINI-GRID CHALLENGES**

- Extension of networks for the mini-grids to capture more load centers.
- Connection subsidies for consumers have been introduced to realize more connections.



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# THANK YOU

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