Lighting up a Village

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Energy Poverty







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1.2 Billion People Do Not Have Access to Electricity

17% of the world

Twice the number of Americans that have <u>ever</u> lived.

Source: Sustainable Energy For All, Global Tracking Framework, Vol. 3

ACCESS RATE (% OF POPULATION)

FIGURE 2.14A TOP 20 COUNTRIES WITH LOWEST ACCESS RATES

SOURCE: WORLD BANK'S GLOBAL ELECTRIFICATION DATABASE 2012.

POPULATION (MILLION)

FIGURE 2.14B TOP 20 COUNTRIES WITH LARGEST ACCESS DEFICITS

SOURCE: WORLD BANK'S GLOBAL ELECTRIFICATION DATABASE 2012.

Source: Sustainable Energy For All, Global Tracking Framework, Vol. 3

FIGURE 2.2A PUBLIC PRIMARY SCHOOLS WITHOUT ELECTRICITY

SOURCE: : UNESCO INSTITUTE OF STATISTICS (UIS) DATABASE.

SOURCE: : SOURCE: WHO ENERGY IN HEALTH CARE FACILITIES DATABASE

WITHOUT ELECTRICITY

Electrification

Energy and Human Development

at St

Muhuru Bay Energy Kiosk

SEAN NEL

Business Plan

Sustainability

- Long term impact only if the business enterprise is viable and sustainable
- Revenues > costs
 - Revenue from energy delivery service: portable battery kit rental service
 - Costs: operational, maintenance, and replacement
- No longer dependent from outside financial support
- Size and cost of microgrid should be appropriate for local community

Create robust business plan

Assessment Trip

- Meet with prospective local vendors
- Asses the current household energy expenses
- Gauge interest for Portable Battery Kit rental service
- Poll how much they are willing to pay for it

Survey Results

- 69 surveys conducted
- Average household energy expenses:

Item	Monthly Expense (US\$)
Batteries	3.50
Candles	0.65
Kerosene	4.65
Phone Charging	2.06
TOTAL	10.86

- Willing to pay up to \$13/month
- Very interested in PBK rental service

Business Model for Portable Battery Kit Service

Revenue

Monthly Subscription Fee	\$12.56
Enrollment Fee	\$5.68
Cellphone charging at the Kiosk	\$0.11
Sale of accessories	
Sale of cold drinks	

Costs

Operational & Maintenance Costs	\$150/month
Replacement Costs	\$600/month

Technology Design and Implementation

Design is Complicated

- Factors
 - Wind (how much is there?)
 - Solar (how sunny is it?, how many hours per day?)
 - Portable Battery Kit Load
 - 5 Ah PBKs
 - 12 Ah PBKs
 - Load to School
 - Cost
- Research, Site Data, 3Tier, Site Assessment
- Homer simulation takes the data and suggests a design based on the factors.

Portable Battery Kits

- 17 Ah @ 12VDC (204 Wh)
- Weight: 12.5 lbs
- Efficient 1.25W LED bulbs
- +72 hours continuous light

Technical Details

Designed for up to 96 Battery kits

Implementation

datalogger.maciq.com/dashboard/#Muhuru_Dashboard

Muhuru_Dashboard - (http://datalogger.maciq.com/dashboard/Muhuru_Dashboard)

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Energy Kiosk Operation

Training the Microgrid Personnel

- Technical training
- Business training
- Train the customer

Community Event to introduce the Battery Kit Rental Program (August 25, 2014)

Community Event – Residents Signing Up (August 25, 2014)

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Phone Charging

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Cont

Dr. Louie

LED Light

Portable Battery Kit

Early Reports

- [#] As of 11/17, 67 Portable Battery Kits are rented out out of stock!
- Residents not used to monthly payments
 - Weekly payments is more manageable
- Residents initially thought that the program was rent-to-own proposition
 - Battery rental is a service
 - The rental price is based on the life span of the battery
- Slightly Behind Schedule
 - Late delivery of battery kits
 - Personnel issues

What's Next?

Monitor and support

- Daily monitoring
- Monthly reports
- 1 or 2 post-installation visits
- Impact Assessment

- More hours studying? Higher grades? Added income?
- Learn
- Expansion
 - Families of all students
- Future projects
 - Kenya and Zambia

Access to electricity can affect various and unexpected aspects of life

- Number of meals per day
- Number of wives
- Prayer/worship
- Arrangement of houses
- Re-normalization of standards

- Time keeping
- Level of government control
- Amount of sleep
- Frequency of intercourse
- Relaxation activities

Want to do more?

- kWh (kilowatts for Humanity) bi-weekly meetings
- Next meeting:
 - December 4 (Thursday), 7PM
 - Seattle University, Bannan 215
 - http://muhurubay.ewbseattle.org/
- Contact hlouie@ieee.org for more information

Our Team

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