



Energy for Development

Replication of rural decentralised off-grid electricity generation through technology and business innovation

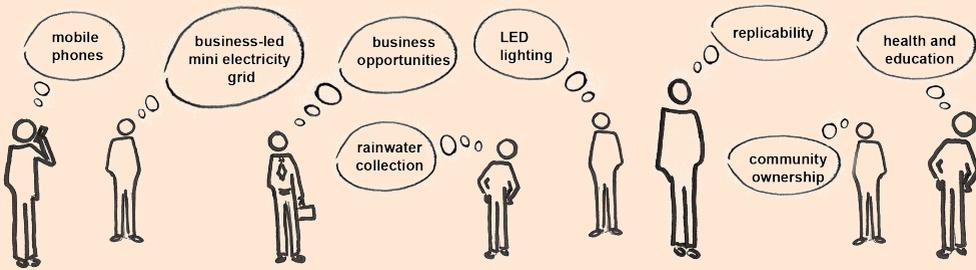
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2014

ENERGY FOR DEVELOPMENT (E4D) PROJECT

Reliable and affordable sources of energy are fundamental not only for wellbeing but also for economic growth and poverty alleviation. Fulfilling the energy needs of developing countries without compromising the environment is a challenge requiring imaginative policies and methods. Many rural communities do not have access to the national electricity network, denying them the health benefits and quality of life provided by electrical services. These include health services, education, lighting and refrigeration. The installation of modular renewable energy technologies that can be operated by the community can provide solutions for the development of these areas.



This innovative project aims to implement sustainable rural electrification with three key components:

People: Engagement of the local community in determining their needs, aspirations and goals, A thorough assessment of the social, economic and cultural context of the community is essential to identify the most appropriate system.

Products: Selection of technologies that are best suited for the local situations based not only on the resources available but on the wants and needs of the community.

Process: The introduction of energy systems must be accompanied by the development of business processes to allow sustainable replication, deliver social benefits and generate wealth for the community.



Project Philosophy

E4D understands the importance of replication for rural electrification. This has led to the development of four concise templates which outline the philosophy of the project and allow this project model to be applied to various rural locations across Africa.

1

Co-operative

- * Set up of local co-operative
- * Membership and management
- * Financial set-up



2

Technical design

- * Site resource assessment
- * Rainwater harvesting system
- * Community connectivity



3

Implementation

- * Technology installation
- * Financial model and projections
- * Cooperative accounts management



4

Social Impacts

- * Healthcare
- * Education
- * Business opportunities



KITONYONI, Kenya

Kitonyoni is an off-grid rural market village in Makueni County, Kenya. The Energy for Development (E4D) Network worked closely with the residents to determine their needs, aspirations and goals with respect to electricity supply and business development. Following an extensive baseline survey, a solar power system with rain water harvesting facilities was installed allowing the local businesses in the village trading centre to have access to reliable, renewable electricity. The system is managed and maintained by a local co-operative and the project has been supported by the local and national government in Kenya.

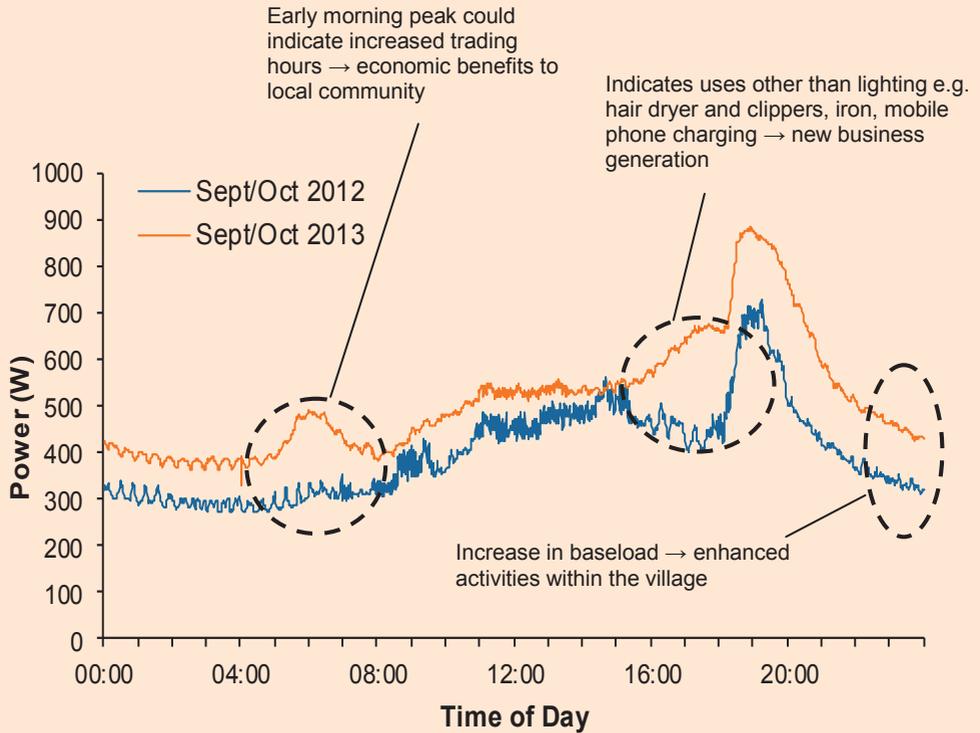


Since the installation of a 13.5 kWp solar photovoltaic system in September 2012, there are clear indicators that the trading centre in Kitonyoni is being transformed with land prices increasing, a number of new buildings constructed, new businesses opening and existing business owners reporting, in most cases, profit increases of over 100%. There have also been clear improvements in healthcare provisions with a newly donated, fully electrified maternity ward in operation.

The innovative, holistic approach adopted by the E4D project has made it a beacon for sustainable development in Africa attracting many local and international visitors from places such as Japan, Germany, UK, Zambia, the World Bank and other funding agencies.



Electricity usage in Kitonyoni



The **22%** overall increase in electricity use since installation in Sept 2012 is promising for the project as it demonstrates a growing demand in one of the poorest areas Kenya which is likely to make this project sustainable in the long term.



BAMBOUTI, Cameroon

The E4D team deployed another 6kWp system designed for a specific community in Bambouti in eastern Cameroon. This was done in collaboration with Cameroon Catalyst which is a joint venture between the Mosame Trust and students from the University of Southampton. As with the pilot project in Kitonyoni, the solar power plant in Bambouti is managed and maintained by a local co-operative who also provide the E4D team with regular updates and data relating to electricity consumption in the village.



This second installation is expected to provide valuable insight into the replicability of this project at different scales. The 'energy kiosk' model in operation here allows the solar electricity system to be used as a central charging station providing many services to the surrounding villages.

Project Details

- * Location: Eastern Cameroon
- * Population: **750** people, **3** local businesses
- * System type: 6kW PV array connected to medical centre and '**energy kiosk**'
- * Installation: **October 2013**
- * Partners: Cameroon Catalyst, Mosame Trust

OLOIKA, Kenya

A second project in Kenya is currently in planning with the system design completed and on-going contact with local stakeholders and co-operative members.

Project Details

- * Location: Southern part of Kenya's rift valley, near Tanzanian border
- * Population: **1,435** people, **60** local businesses
- * System type: **solar PV minigrid** connected to businesses, health centre and school in trading centre
- * **Rain water collection** facilities
- * Installation due to begin: **early 2014**
- * Partners : Rural Electrification Authority (REA), Kenyan Ministry of Energy

Future Plans

The data obtained from these projects will be used alongside that from Kitonyoni to develop templates outlining site selection, finances, system design and establishment of a functional co-operative with the aim of making rural electrification a sustainable and replicable possibility.

In addition to the planned installation in Oloika, a number of other sites are being considered. These include villages in Mozambique, Zambia and Uganda.

We are searching for partners willing to support future installations in other locations. If you are interested in our work or think your company, government or institution would be able to offer help or expertise, please contact us through the details overleaf or through our website.





PROJECT PARTNERS

Jomo Kenyatta University (Kenya), University of Dar es Salaam (Tanzania), University of Nairobi (Kenya), Eduardo Mondlane University (Mozambique), Makerere University (Uganda), University of Ghana, African Institute for Development Policy (Kenya), International Energy Agency, GVEP (International), EUREC Agency (Belgium/European Union), Alliance for Rural Electrification, (Belgium/International), Norwegian Agency for Development (Norway), East African Energy Technology Development Network (Kenya/Tanzania/Uganda), IT Power (Kenya), The World Bank (International), Utilicom Limited (UK)

ENERGY FOR DEVELOPMENT PROJECT

The Energy for Development network consists of engineers, social scientists, business and finance experts. The partners within the network are: University of Southampton Sustainable Energy Research Group & Centre for Global Health, Population, Poverty and Policy; Imperial College Business School, Innovation and Entrepreneurship; Research Councils UK (RCUK) and Department for International Development (DFID) Energy Programme.

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