MICRO-GRID ACADEMY

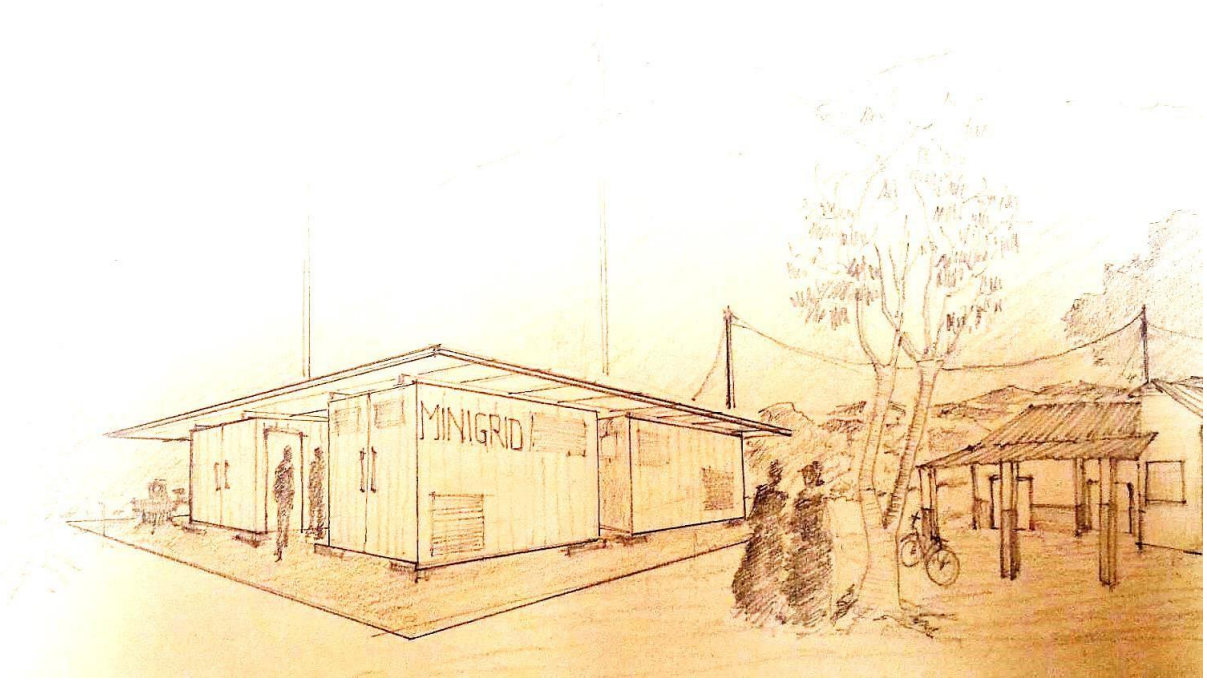
Rural Community needs & Demand Assessment

Basic components of Decentralized Energy Systems

Field Works in Talek Mini Grid

Concept Note and Agenda

DRAFT 24/11/2019



20th – 24th January 2020

Nairobi, Kenya

1. INTRODUCTION AND CONTEXT

The provision of affordable, reliable, and sustainable energy is essential for the development of sustainable economies, as it advances and strengthens productive capacities that promote socio-economic development in an environmentally sound manner.

However, all the East African Community (EAC) partner States face significant energy challenges. A huge proportion of the population within the EAC region remains without access to modern energy services and subsequently the progress in expanding electricity access has lagged behind despite the ever-growing population in the region. Although there has been some progress in scaling up access to modern energy in the EAC region, electricity access in region is still just about 30%. A lot still has to be done in order to achieve electricity for all by 2030, as pert the aspirations expressed in the Sustainable Development Goals (Goal#7).

Micro-grid (MG) is one of the most viable options for generation capacity increase in Africa to solve raising urban and rural electricity needs.

Electricity from microgrids can support new businesses in a village generating economic development. In fact, the EAC region has several operational small hydropower plants based on solar photovoltaic, mini hydro and other renewable energy technologies.

Despite some clear advantages of private sector participation in electrification efforts, there are several challenges that must be overcome to make these projects attractive to potential investors and project developers. The challenges include security of revenue streams, long-term risks and policy certainty, regulatory transparency and complexity, as well as practical challenges relating to local organizational structures and technical skills for operation and management of micro-grids.

2. OBJECTIVES OF THE MICRO-GRID ACADEMY

The Micro-Grid Academy (MGA) was launched in January 2018; in its pilot years of training activities, it has managed to reach more than 350 people mainly from the East-African countries as well as Ethiopia, Somaliland and Zambia. The specific objective of the MGA is to conduct capacity building activities on energy access and decentralized renewable energy solutions directed towards African young technicians, managers and engineers. It is line with this goal that a 20-40 kW mini-grid system will be installed on-site at St. Kizito to continuously support the vocational training activities on ground. This will contribute to enhancement of access to energy in rural communities and foster local enterprise and job creation.

3. COURSE CONTENTS

The training will be focus on **Mini-grids** through the guide of the new curriculum developed in collaboration with Strathmore University.

The curriculum will be composed of four modules namely:

Module 1

1.1 Microgrids, Rural Community needs and Demand Assessment

1.2 Basic components of Decentralized Energy Systems (Energy Engineering)

1.3 Renewable and non-renewable sources, Mini-grid design and development

Module 2

2.1 Safety in O&M of small-scale renewable energy systems

2.2 Operation and maintenance of microgrids

Module 3

Microgrids Engineering, Procurement and construction

Module 4

Economics on mini-grid, business models and micro project financing, policy and regulatory framework

The new curriculum will provide a general overview of the whole mini-grids' value chain for rural electrification, hands-on learning in labs about renewable energy technology.
The site visit to a community mini-grid will be at Talek.

4. CERTIFICATES

Upon successful completion, the participants will receive certificates of attendance.
All the modules shall be compulsory for a student to attain a complete MGA diploma

5. PARTICIPANTS QUALIFICATION AND PREPARATION

- The course is open to a maximum of 50 participants from the EAC Partner States.
- Participants will be technicians, operators or entrepreneurs dealing with micro-grid projects.
- Applicants must be able to speak and read English.
- Applicants from all countries can apply to participate to the MGA. However, applicants from Sub-Saharan countries and particularly from East African Community will be given priority.
- Applicants up to 30 years old and women (of any age) will be given priority.

6. REGISTRATION PROCESS

Applicants should complete the application form and send their CV by e-mail to info@microgridacademy.org and copy info@eacreee.org **by 29th December 2019** . The applications must be endorsed by the employer. Nominations received after deadline will not be considered.

7. FINANCIAL ARRANGEMENTS AND LIABILITIES

There will be **no tuition fees charged**. However, **the costs of travel and accommodation during the training course will be covered by each participant or their employers**. The organizers will provide course materials, modest lunch and coffee breaks during the course.
It will be the responsibility of each participant to make his/her own reservation and arrangements for commuting between the hotel and the venue. The participants should get in touch with the local organizer, Carol Mwenda (mwendwacarol.avsi@gmail.com), for assistance in booking the accommodation.

8. LIABILITIES OF DAMAGES

The organizers of the course do not accept liability for the payment of any cost or compensation that may arise from damage to or loss of personal property, or from illness, injury, disability or death of a participant while he/she is traveling to and from the course, and it is clearly understood that each participants (or sponsor), undertakes responsibility for such coverage. The participants would be well advised to take out insurance against these risks.

9. THE ORGANIZERS AND PARTNERS

The course is jointly organized by the East African Centre of Excellence for Renewable Energy and Efficiency (EACREEE), Renewable Energy Solutions for Africa (RES4AFRICA), AVSI Foundation, Kenya Power and Lighting Company (KPLC), Strathmore University, St. Kizito Vocational Training Institute and supported by Enel Foundation.

Local Organizer (Contact Person) is:

Carol Mwendwa - AVSI Foundation mwendwacarol.avsi@gmail.com Tel: +254 721 851 957

Alternative contact persons:

Prof. Andrea Micangeli RES4Africa andrea.micangeli@uniroma1.itT Tel: +39 338 815 3787

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Micro-Grid Academy Modules 1.1 & 1.2

AGENDA

20th – 24th of January 2020, Nairobi, Kenya

Microgrids, Rural Community needs & Demand Assessment
Basic components of Decentralized Energy Systems
Field Works in Talek Mini Grid

Module 1.1 Microgrids, Rural Community needs & Demand Assessment

Introduction to Energy Access and Micro-grid
Productive Power for Rural Communities
Community Engagement & Demand Assessment
Productive Use of Energy and Business Models

Module 1.2. Basic components of Decentralized Energy Systems (Energy Engineering)

Load analysis for off-grid systems, Micro-Grid Basic Elements
PV arrays & mounting structures, Types of PV systems

Field Visit And Practical Exercises

PV module mounting structure exercise, Charge controllers and MPPTs
Batteries – technology, Batteries - practical demonstration/exercise
Fuel generators,Off-grid PV - diesel system design

Classes: 70% Classwork (18 h) - 30% Fieldwork/workshop practical sessions (7h)
Exams: Oral 20%, Practical 30%, Written 50% (2h)

Agenda

DAY 1 – January 20th
Introduction - Micro-Grids for Community Development (Mod 1.1) – KPLC Ruaraka*

08:00 – 09:00	Registration
09:00 – 09:30	Welcome remarks (access to energy, electrification, SDGs)
09:30 – 11:00	Introduction to Renewable Energy Grids
11:00 – 11:30	Productive Power for Rural Communities
11:30 – 13:00	LedSafari – e.learning training platform
13:00 – 14:00	*Lunch break*

14:00 – 15:30	Community Engagement
15:30 – 17:00	Needs and Opportunities Assessment

DAY 2 – January 21st – AVSI – Rosyambu *

Renewable Energy Technologies for Decentralized Applications (Mod 1.1 – 1.2)

09:00 – 11:00	Productive uses of energy
11:00 – 13:00	Indicators of rural development projects
13:00 – 14:00	*Lunch break*
14:00 – 15:30	Energy plants basic elements
15:30 – 17:00	Micro-grid architecture

DAY 3 – January 22nd – Strathmore University*

Micro-Grid Design (Mod 1.2)

09:00 – 11:00	Energy management and control systems and energy storage
11:00 – 11:30	Load analysis for off-grid systems
11:30 – 13:00	Types of PV systems and Preliminary design
13:00 – 14:00	*Lunch and* Departure to Talek Mini-Grid

DAY 4 – January 23rd – Talek *

Training on field: PV technologies (Mod 1.1 - 1.2)

09:00 – 13:00	PV module mounting structure exercise, Charge controllers and MPPTs, Large arrays & mounting structures Batteries – technology, Fuel generators
13:00 – 14:00	*Lunch break*
14:00 – 15:30	Productive uses of energy connected to micro-grids
15:30 – 17:00	Return to Nairobi

DAY 5 – January 24th Final Day (Mod 1.1 – 1.2) – St Kizito* – Githurai

09:30 – 11:30	Off-grid PV-diesel system design
11:30 – 12:30	Project Woks in Team
12:00 – 13:30	EXAMS
13:30 – 14:30	Lunch
14:30 – 17:00	Final Cerimony