



# *MICRO-GRID ACADEMY*

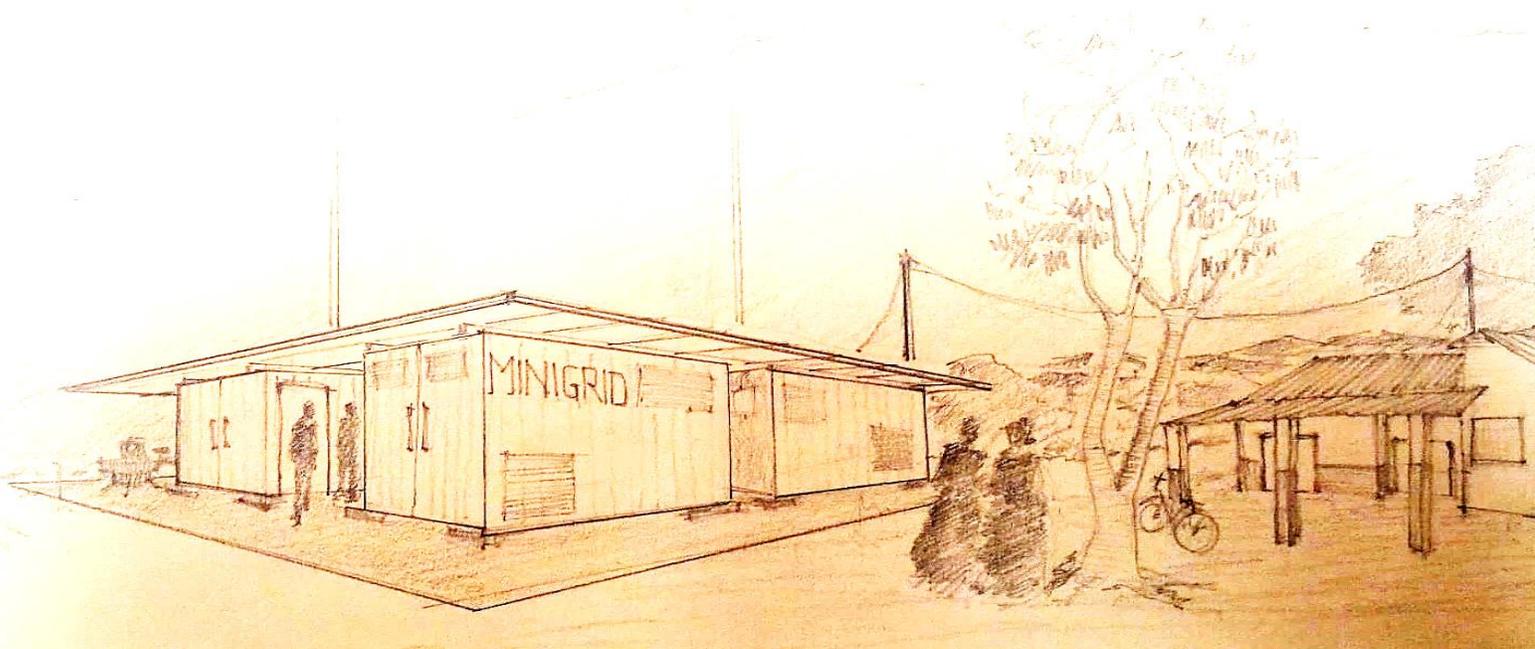
## *Module #1 - Online Training*

### Basic components of Decentralized energy systems (DRE) and Community needs assessment

Online training 25–27 January – 1–3 February 2022

Field visit at St. Kizito Facility and/or Strathmore Solar Energy Centre,

Nairobi, Kenya if possible, another field visit at Ethiopia or Uganda  
(Date to be defined)



Concept Note



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## 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 the area is still just about 30%. A lot still has to be done in order to achieve electricity for all by 2030, as per the aspirations expressed in the Sustainable Development Goals (Goal#7). Micro-grids (MGs) is one of the most viable options for generation capacity increase in Africa to solve raising urban and rural electricity needs. Electricity from micro-grids 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 aims to train over 200 students per year and it has managed to reach more than 1095 people mainly from the East-African countries as well as Ethiopia, Congo, Mozambique, Zambia, South Africa and others. 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, aiming at creating a specialized local workforce. This will contribute to the enhancement of access to energy in rural communities and foster local enterprise and job creation, through the empowerment of young people's knowledge and skills.

The training programme provides participants with a **complete theoretical and practical training**, with a set of technical, economic and regulatory core competences and advanced tools to assess and deploy



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the most appropriate solutions in different African energy contexts for an efficient and effective integration of renewables in emerging electricity markets, whilst nurturing an international network of experts.

Among others, the MGA will contribute et the following:

- **Building human capacity** for the development and **implementation of new energy** technologies;
- **Strengthen** the capacity of key stakeholders and decision-makers to develop and effectively implement RE programs;
- **Overcome regulatory, financial and technical barriers** that are preventing the engagement of international private-public sectors;
- Strengthening and expanding **national and regional networks**, stimulating **regional cooperation and knowledge-exchange**;
- Create **managerial, technical, soft and entrepreneurship skills** across African professionals, including project management and market design, Operation and Maintenance (O&M), and best practices in the policy and regulatory frameworks;
- Focusing on **social inclusiveness**, specifically integrating youth and women participation;
- Creating **networking opportunities** and a **community of peer experts and professionals** that will encourage exchange of experiences also in the future.

### 3. COURSE CONTENTS

The training will be focused on **solar mini-grids** through the guide of the MGA standard curriculum developed in collaboration with Strathmore University. The MGA 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.

More specifically, this course will deal in detail with the **Module 1 of the MGA Curriculum "Module 1 Decentralized energy systems (DRE)"**, namely:

Module 1.1 Introduction to renewable energy (demand and resources, with country focus)

Module 1.2 Renewable and non-renewable generation solutions

Module 1.3 Community needs assessment and impact evaluation

More specific information on the topics addressed are indicated in the agenda in Section 13 of this document.



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## 4. METHODOLOGY

The methodology foreseen for this course will be based on **e-learning dynamics**. More specifically:

- 1) The majority of the training will be delivered via **video e-lectures** (about 4.00 hours each). Participants will be granted access to MGA-managed digital utilities (Moodle E-learning platform Zoom, YouTube Channel);
- 2) Additionally, the **MGA Moodle platform** will be used. In it, the participants will be able to find the didactic materials, which they are expected to consult before the training sessions. Moreover, the platform will be used to gather feedback, administrate surveys, exams and questionnaires, access to the training recordings, provide certificates, etc.
- 3) The e-lectures will be complemented, if possible, by **one or two field visits** at St. Kizito's mini-grid facility in Nairobi, and/or at Strathmore University Research Center in order to put in practice what the trainees learnt beforehand;
- 4) The e-lectures will be managed by **lecturers** belonging to **MGA and RES4Africa stakeholders and partners coming from private-public high-level entities operating In the Energy sector**;
- 5) At the end of the training, the students will take a final examination, to assess the newly acquired skills and knowledge.

## 5. CERTIFICATE

Upon successful completion, the participants will receive certificates of attendance. The official Certificate of attendance will be granted to the trainees who **will have attended at least 70%** of the total amount of training hours, and who will have successfully taken the final exam and participated in the final survey.

## 6. PARTICIPANTS QUALIFICATIONS AND PREPARATION

- The course is open to about **120 participants from African States**. Priority will be given to participants with nationality belonging to countries of the **East African Community**;
- Participants will be technicians, students, operators, entrepreneurs and professionals dealing with Renewable Energy Sector;
- Applicants must be able to speak and read English;
- Applicants up to 30 years old and women (of any age) will be given priority.



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## 7. REGISTRATION PROCESS

Applicants should complete the [Application form](#) (uploading in it their CV and Motivation Letter in .pdf). A notification e-mail should be sent to [info@microgridacademy.org](mailto:info@microgridacademy.org). The deadline for the completion of the Application form and notification email is **11 January 2022 at 12.00 pm CET**. Endorsement by an employer or a supervisor will be considered a plus, with the reference letter to be uploaded into the Application Form. Applications received after the deadline will not be considered.

## 8. FINANCIAL ARRANGEMENTS AND LIABILITIES

**Tuition fees will be covered by RES4Africa** thanks to the support of Enel Foundation.

The organizers will provide course materials. In occasion of the field visit at St. Kizito VTI and at Strathmore, the Micro-Grid Academy will cover costs related to the visit itself (trainers, venues, etc.), insurance and a light meal.

## 9. 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 participant (or sponsor), undertakes responsibility for such coverage. The participants would be well advised to take out insurance against these risks.

## 10. THE ORGANIZERS AND PARTNERS

The course is jointly organized by Renewable Energy Solutions for Africa (RES4AFRICA), AVSI Foundation, Kenya Power and Lighting Company (KPLC), Strathmore University, St. Kizito Vocational Training Institute, East African Centre of Excellence for Renewable Energy and Efficiency (EACREEE) and supported by Enel Foundation. For further information and queries, get in touch with the MGA team ([info@microgridacademy.org](mailto:info@microgridacademy.org)).



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## 11. FIELD VISIT AND PRACTICAL EXERCISES

The field visit at St. Kizito VTI and to Strathmore University, Solar Energy Research Center in Nairobi (Kenya) if possible, another field visit will be there in Ethiopia or Uganda will be carried out after the implementation of the training. It will be a unique chance, for the students, to experience in first person the technologies, concepts and tools studied during the classes.

Due to Covid 19 pandemic travel restriction the field visit will be destined only to students coming from Nairobi, Ethiopia, or Uganda if possible and its neighborhood. Detailed info will be provided during the course.

## 12. TIMELINE

Activity	Proposed Date
Launch of the call for applications	16th December 2021
Deadline of the call for applications	11 <sup>th</sup> January 2022
Training implementation	25-27 January – 1-3 February 2022
Field visit	TBD

## 13. TENTATIVE AGENDA

Day 1		25/1/2022	4,30 hours lesson- Introduction to Renewable Energy (demand and resources, with country focus)
Time (mins)	Time Slot EAT	Lesson	Title
40	11.00-11.40	<b>INTRO 1</b>	Introduction- Welcome Remarks, Participants Presentation
20	11.40-12.00		Introductory Session for Participants
40	12.00-12.40	<b>1.1.1</b>	Rural Electrification Needs Worldwide
20	12.40-1.00		Break
60	1.00-2.00	<b>1.1.2</b>	Renewable energy resources potential in Africa (solar, wind, hydro, biomass)
70	2.00-3.10	<b>CS-2 / ES-1</b>	Case Study - 2 / Entrepreneurship Skills
10	3.10-3.20		Closing Remarks
<b>260</b>	<b>4,3</b>		
Day 2		26/1/2022	4.50 hours lesson- Renewable and Non-Renewable Generation Solutions



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Time (mins)	Time Slot EAT	Lesson	Title
30	11.00-11.30	WG	Working Group Introduction
30	11.30-12.00	1.1.3	Key concepts on solar energy radiation
45	12.30-1.15	1.1.4	Solar resource characterization for DRE design
35	1.15-1.45		Break
65	1.50-2.55	1.2.4	Overview of the different types of delivering energy access, with a techno-economic comparison and a focus on micro-grids
60	2.55-3.55	WG	Working Group
5	3.55-4.00		Closing Remarks
270	4,5		
<b>Day 3</b>		<b>27/1/2022</b>	<b>4,3 hours lesson- Renewable and Non-Renewable Generation Solutions</b>
Time (mins)	Time Slot EAT	Lesson	Title
70	11.00-12.10	1.2.5	Basic technological architecture of a micro-grid
40	12.10-12.50	1.2.6	Micro Grid Architecture and Management Systems -Case Studies
30	12.50-1.20		Break
40	1.20 -2.00	1.2.7	Practical in PV Technologies: on-field experiences
70	3.10	WG	Working Group
5	3.15		Closing of the session
255	4,3		
<b>Day 4</b>		<b>1/2/2022</b>	<b>4,6 hours lesson- Community Needs Assessment and Impact Evaluation</b>
Time (mins)	Time Slot	Lesson	Title
60	11.00-12.00	1.2.8	Load Profile Exercises
60	12.00-1.00	1.3.1	Energy for productive uses in rural communities
30	1.00-1.30		Break
60	1.30-2.30	1.3.2	Energy needs assessment of a greenfield community
60	2.30-3.30	WG	Working Group
5	3.35		Closing of the session
275	4,6		
<b>Day 5</b>		<b>2/2/2022</b>	<b>4,25 hours lesson- Community Needs Assessment and Impact Evaluation</b>
Time (mins)	Time Slot		
40	11.00-11.40	1.3.4	Rural electrification needs - Multi Tier Energy Approach



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60	11.40-12.40	1.3.5	How to assess and quantify impact and development scenarios for micro-grid project
30	12.40-1.10		Break
45	1.45-2.30	1.3.3	Community engagement needs in developing rural electrification projects
80	2.30-3.50	WG	Working Group
5	3.50-3.55		Closing of the session
255	4,25		
<b>Day 6</b>		<b>3/2/2022</b>	<b>5,25 hours lesson- Community Needs Assessment and Impact Evaluation</b>
<b>Time (mins)</b>	<b>Time Slot</b>		
90	10.00-11.30	CS-2 / ES-1	Case Study - 2 / Entrepreneurship Skills
60	11.30-12.30	CS-1	Case Study: Community Engagement
30	12.30-1.00		Break
120	1.00-3.00	WG	Working Group Final Presentation
15	3.33-3.15		Closing remarks
315	5,25		
<b>Day 6</b>		<b>3/2/2022</b>	
<b>Time (mins)</b>	<b>Time Slot</b>		
-	-		Field Visit