



# ***31<sup>st</sup> Edition of RES4Africa Academy Technical and Vocational School***

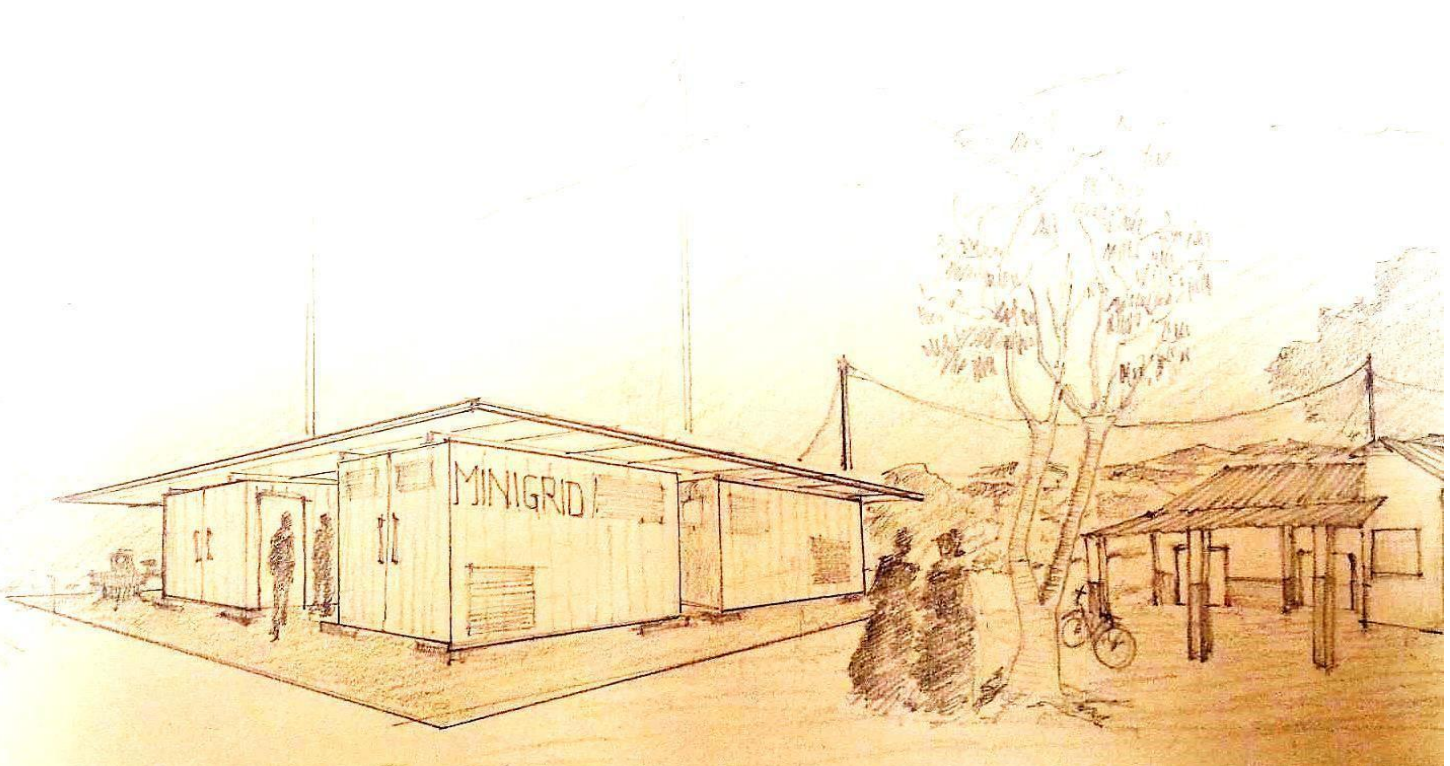
**MICRO-GRID ACADEMY:**

**Module #2 - DRE site selection and engineering**

**In-person training in Kenya**

**23-27 October 2023**

## **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) are one of the most viable options for generation capacity increase in Africa to solve rising 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, several challenges must be overcome to make these projects attractive to potential investors and project developers. The challenges include the 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 the operation and management of micro-grids.

The RES4Africa Academy is the “environment” in which all those initiatives converge and grow from 2023 on. The Academy’s offer is composed of a dynamic set of training and capacity-building initiatives, having in common:

- Openness, providing the largest access to content to maximize the impact;
- Inclusion, to have all on board (social, gender, and geography) with no exception;
- Promotion of youth and women empowerment and participation;
- Covering all capacity building levels (vocational, professional, managerial, ...);
- Leverage members’ participation and external support with a special focus on local partners;
- Close relationships with industry, entrepreneurship and labor market;
- Customization to local requirements in terms of didactic content and accreditation;
- Knowledge-sharing as an opportunity of mutual exchange of experiences.

## 2. OBJECTIVES OF RES4AFRICA TECHNICAL AND VOCATIONAL SCHOOL

The Micro-Grid Academy (MGA) was launched in January 2018. Aiming to train over 200 students per year, the program has so far managed to reach nearly 1800 people from over 45 African countries, including East Africa, Sahel, and SADC, and mainly Ethiopia, Kenya, Mozambique, Zambia, South Africa, among others. Since 2023, the MGA has turned into the RES4Africa Technical and Vocational

School, while maintaining its original objective of conducting capacity-building activities on energy access and decentralized renewable energy solutions for young African technicians, managers, and engineers in order to create a specialized local workforce. This contributes to increasing and improving access to energy in rural communities while fostering local entrepreneurship and job creation through the empowerment of young people's knowledge and skills.

The training program provides participants with comprehensive theoretical and practical training, including technical, economic and regulatory competencies, and advanced tools to assess and deploy the most appropriate solutions in different African energy contexts. This approach enables efficient and effective integration of renewables in emerging electricity markets, whilst nurturing an international network of experts.

Among others, the Technical and Vocational School contributes to the following:

- Build 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;
- Strengthen and expand national and regional networks, stimulating regional cooperation and knowledge exchange;
- Create managerial, technical, soft and entrepreneurial skills among African professionals, including project management and market design, Operation & Maintenance (O&M), and best practices in the policy and regulatory domains;
- Focus on social inclusion, specifically integrating youth and women participation;
- Create networking opportunities and a community of peer experts and professionals that will encourage the exchange of experiences also in the future.

### 3. COURSE CONTENT

The training focuses on solar mini-grids according to the standard curriculum developed in collaboration with Strathmore University and registered under the Kenyan National Industrial Training Authority (NITA). This curriculum consists of 4 Modules which provide a general overview of the whole mini-grids value chain for rural electrification and hands-on learning in laboratories about renewable energy technologies.

More specifically, this course will be implemented and delivered in collaboration with Strathmore University and will focus on Module 2: DRE site selection and engineering.

- Module 2.1: Site selection, demand assessment, and load forecasting;
- Module 2.2: Renewable mini-grid components (PV);

Relevant topics for each module include, among others:

- Module 2.1: Micro-grid site selection, Micro-grid pre-feasibility and feasibility studies, site

assessment and demand forecasting;

- Module 2.2: Solar Irradiation, Types of PV systems, PV cells modules and arrays, PV array cables, PV array combiner boxes, fuses and disconnect switches, Batteries – technology, Batteries - configuration and fuses, Batteries - installation commissioning and maintenance, Batteries - practical demonstration exercise, Charge controllers and MPPTs, Inverters overview, Inverters and inverter-chargers for off-grid systems (DC Coupled), Inverters in AC coupled off-grid systems, Fuel Generators, Large PV arrays mounting structures, PV module mounting structure and exercise.

#### 4. METHODOLOGY

The methodology foreseen for this course will be in-person training in Nairobi, Kenya, with some online classes led by international experts, and additional e-learning tools and support. More specifically:

- 1) Lessons will be delivered in-person and via live online lecturers, for which participants will be granted access to relevant digital tools (e-learning platform, Zoom, Youtube channels, etc.);
- 2) The e-learning platform will be used to upload and access didactic materials, surveys and exams, training recordings, etc.;
- 3) The lectures will be delivered at Strathmore University Energy Research Centre and/or at other partners' locations in Nairobi area communicated ahead of the start of the training;
- 4) Lecturers will come from Strathmore University and other programme's local (Kenyan) and regional partners, as well as RES4Africa's members and partners from private-public high-level entities operating in the energy sector;
- 5) At the end of the training, students will take a final survey and a final exam to assess the newly acquired skills and knowledge.

#### 5. CERTIFICATE

Upon successful completion of the course, 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 25 participants;
- Profiles can include students, technicians, operators, managers, entrepreneurs and other professionals dealing with the Renewable Energy Sector;
- Applicants must be able to speak and read in English;
- Applicants up to 30 years old and women (of any age) will be given priority.

#### 7. REGISTRATION AND SELECTION PROCESS

Applicants should complete the [Application form](#) (uploading in it their CV and Motivation Letter in .pdf). A notification email should be sent to [spvtraining@strathmore.edu](mailto:spvtraining@strathmore.edu). The deadline for applications is the 29th of September 2023 at 1:00 pm EAT. Endorsement by an employer or a supervisor will be

considered a plus, with the reference letter to be uploaded into the Application form. Incomplete applications or applications received after the deadline will not be considered.

All applications will be evaluated by RES4Africa and Strathmore University; the selected candidates will receive a confirmation email and will be requested to confirm their attendance. Only confirmed candidates will receive detailed instructions with credentials to get access to the e-learning and virtual platforms.

## 8. FINANCIAL ARRANGEMENTS AND LIABILITIES

Tuition fees will be paid by students as per the below prospect:

Course Fees	Cost*	Deadline to apply
Full fee	KES 50.000	29th September 2023

\*All costs are expressed in Kenyan shillings.

All fees are inclusive of course materials, trainers, training venue, meals during training, and field visits at the premises of the organizing entities in Kenya. Participants will be expected to cover their transport and accommodation costs during the training period. International participants will be expected to cover their VISA, flights, accommodation and in-country travel costs during the training period.

## 9. ORGANIZERS AND PARTNERS

The course is jointly organized by Renewable Energy Solutions for Africa (RES4AFRICA) and Strathmore University, in collaboration with St. Kizito Vocational Training Institute, AVSI Foundation, and other regional and international partners, and supported by Enel Foundation. For further information and queries, please get in touch with the organizing team at [spvtraining@strathmore.edu](mailto:spvtraining@strathmore.edu) at [info@microgridacademy.org](mailto:info@microgridacademy.org).

## 10. FIELD VISIT AND PRACTICAL EXERCISES

The in-class activities will be complemented, where possible, with site visits in the country of training implementation. For this edition in Kenya, practical laboratory activities and a field visit will be conducted at Strathmore Energy Research Centre (SERC) and other partners' facilities in Nairobi to be confirmed.

## 11. TIMELINE

Activity	Proposed Date
Launch of the call for applications	2nd week of August 2023
Deadline of the call for applications	29th September 2023
Training implementation	23rd - 27th October 2023

## 12. TENTATIVE PRELIMINARY AGENDA

5 training days on-field – schedule under definition from 9.00 am to 3.00 pm EAT