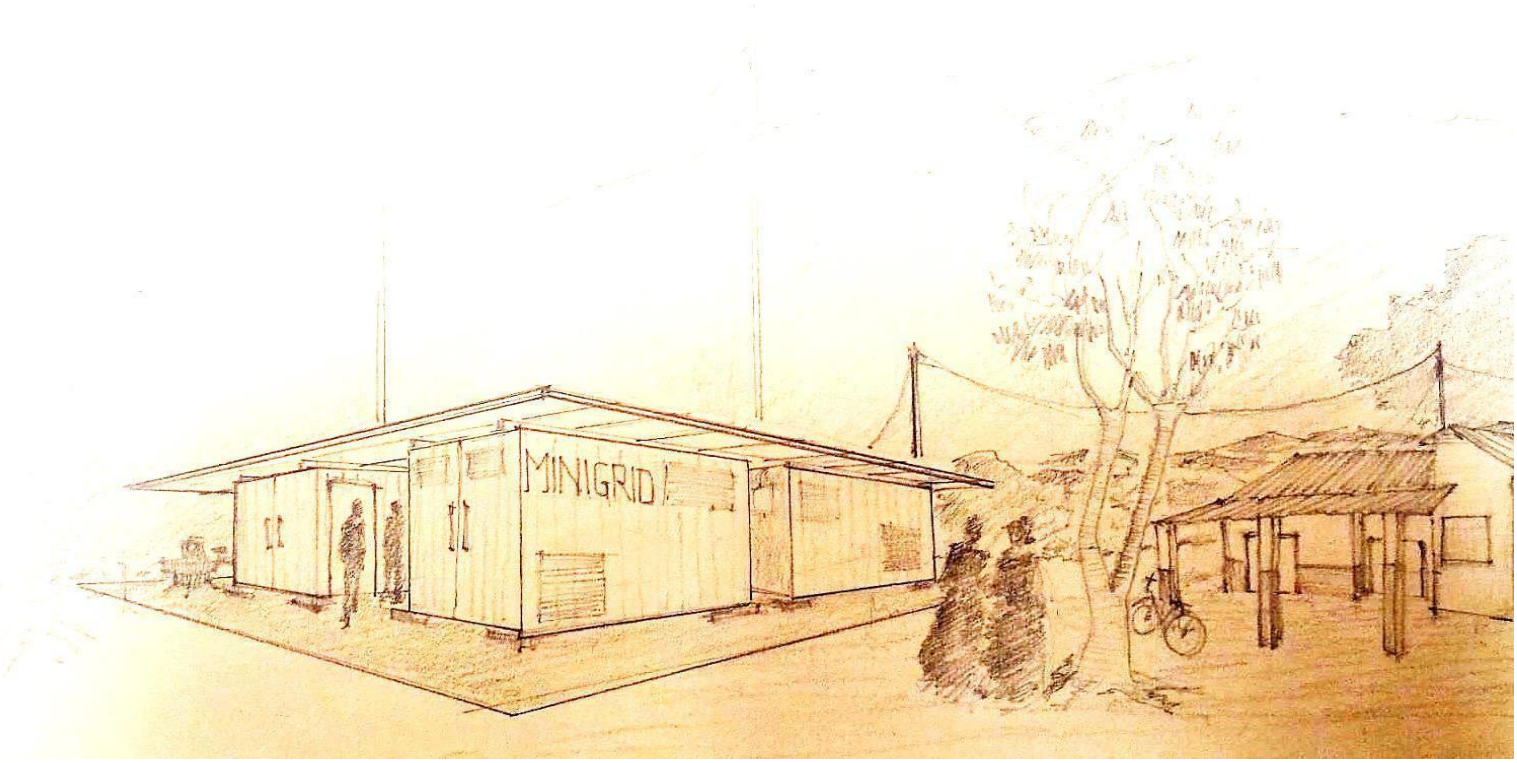
42nd Edition of RES4Africa Academy
Technical and Vocational School

MICRO-GRID ACADEMY:
DRE system design, O&M and safety

In-person training in Kenya

15-19 September 2025

Concept Note



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, 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. Subsequently, the process of expanding electricity access has lagged behind despite the ever-growing population. Although there has been progress in scaling up access to modern energy in the EAC region, a lot still has to be done to achieve electricity for all by 2030 as per the aspirations expressed in the Sustainable Development Goals (Goal#7). Micro-grids 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 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" where 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 greatest 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**;
- **Customisation** to local requirements in terms of didactic content and accreditation;
- **Knowledge-sharing** as an opportunity for 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 200 students per year, the program has so far managed to reach nearly **2050 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 on energy access and decentralized renewable energy solutions** for young African technicians, managers, and engineers to create a specialized local workforce. This contributes to increasing and improving access to energy while fostering local entrepreneurship and job creation by empowering youth 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 3: Decentralized Renewable Energy (DRE) system design, Operation&Maintenance (O&M) and safety:

- Module 3.1: Systems design – manual design and design with software tools;
- Module 3.2: O&M of renewable energy systems;
- Module 3.3: Safety, health and environment.

Relevant topics for each module include, among others:

- Module 3.1: EPC – Engineering (design of off-grid hybrid systems); Load analysis for off-grid system; PV off-grid system design computer aided - HOMER; Shade analysis; PV module strings – wiring and testing; Wiring diagrams for DC-coupled off-grid PV systems; Lighting and surge protection;
- Module 3.2: Operation&Maintenance of microgrids; Monitoring, control and metering (Solar PV Hybrid Micro-Grids); PV system visits/inspections; Energy consumption monitoring;
- Module 3.3: Occupational health and safety, general plant design and operation communication and training and monitoring; Environmental risks and hazards i.e. physical, chemical, biological and social; Electrical and Fire Safety in Solar PV Microgrids.

4. METHODOLOGY

The methodology foreseen for this course will be in-class training in Nairobi, Kenya. More specifically:

1) Lessons will be delivered **in-person** at Strathmore University and/or at other partners' locations in Nairobi communicated ahead of the start of the training;
2) **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;
3) 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 their CV and Motivation Letter). A notification email should be sent to spvtraining@strathmore.edu and elearning@res4africa.org. **The deadline for applications is the 25th of August 2025 at 11:59 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.

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 by proceeding with fee payment.

8. FINANCIAL ARRANGEMENTS AND LIABILITIES

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

Course Fees	Cost*	No. available	Deadline to apply
Round 1 Scholarship	KES 25.000	12	25th August 2025
Round 2 Scholarship	KES 12.500	8	25th August 2025
Full fee	KES 50.000		25th August 2025

*All costs are expressed in Kenyan shillings.

For this course, RES4Africa Foundation, thanks to the support of Enel Foundation, will grant **20 partial scholarships** assigned to early applicants as per the **above calendar** and according to their profile, academic and professional background, and motivation. Qualified female applicants are particularly encouraged to apply.

All fees include 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 have 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 contact the organizing team at spvtraining@strathmore.edu and elearning@res4africa.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 University and other partners' facilities in Nairobi** to be confirmed.

11. TIMELINE

Activity	Proposed Dates
Launch of the call for applications	4th week of June 2025
Deadline of the call for applications	25th August 2025
Training implementation	15-19 September 2025

12. TENTATIVE PRELIMINARY AGENDA

5 training days on-field – schedule under definition from 9.00 am to 4.00 pm EAT

The final agenda will be shared ahead of the start of the training.