



# PROFILES OF CHANGE: YOUTH OPPORTUNITIES IN THE CLEAN ENERGY SECTOR

EEP Africa Thematic Brief Series



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The Energy and Environment Partnership Trust Fund (EEP Africa) is a clean energy finance facility managed and hosted by the Nordic Development Fund (NDF) with funding from Austria, Finland and NDF. It is guided by a vision for a climate resilient, zero-carbon future with the aim of contributing to achievement of the Paris Climate Agreement and Sustainable Development Goals (SDGs). The immediate objective is to enhance clean energy access, development and investment, with a particular focus on benefitting vulnerable and underserved groups. EEP Africa provides early stage grant and catalytic debt financing for innovative clean energy projects, technologies and business models in Southern and East Africa.

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## INTRODUCTION

Africa's future depends on productively harnessing the power of its youth to stimulate inclusive, green growth. This is a priority for governments in the region and a key component of regional and international development strategies, including the African Union's Agenda 2063 and the United Nations' Sustainable Development Goals (SDGs). The clean energy sector has high potential to create jobs and sustainable livelihoods for African youth. EEP Africa supports projects that contribute to these goals and open new pathways to growth for current and future generations.

Job creation is one of EEP Africa's key objectives. Since 2010, projects financed by EEP Africa have produced over 8,200 permanent jobs in the clean energy sector in East and Southern Africa, including more than 2,700 jobs for youth. In addition, a substantial number of temporary jobs have been available to youth during project implementation. Many companies in the EEP Africa portfolio indicate that they prefer employing young people (defined as 18-25 years old) because they are eager to learn, easy to train, tech savvy and work hard. These projects provide skills and experience that are enabling young people in Africa to build long-term careers or develop entrepreneurship opportunities.

This brief explores different opportunities for African youth in the clean energy sector, with examples from the EEP Africa portfolio of projects. The main barriers to youth employment are identified, along with recommendations on how to overcome them. Information about regional initiatives to develop skills and create jobs are also presented. Finally, potential career paths for young people in the clean energy sector are highlighted throughout in a selection of personal impact stories.

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Ensol hires and trains local youth in Mpale, Tanzania to service and maintain its 48kW solar PV mini-grid.

## KEY FACTS

**62%** 

of the population in Sub-Saharan Africa is under the age of 25

**35%** 

of female youth are not in employment, education, or training, compared with 20% of young men



By 2050 the number of African youth is expected to double to over

**830 million**

**10-12 million** 

young Africans enter the job market each year but only **3 million** formal jobs are created annually

**Clean energy jobs are being created through the:**



**direct generation and distribution of energy**

(design and construction; sales and marketing; technical installation, repair and maintenance);



**productive use of energy**

(agricultural sector, service sector, entrepreneurs)



EEP Africa projects have demonstrated that a business selling

**100,000**

solar home systems per year can create jobs for up to

**800 rural sales agents and 200-300 rural technicians**



EEP Africa has created over

**2,700 jobs**

for youth in the clean energy sector (**33% of total jobs created**)



EEP Africa's portfolio shows that hydropower projects create the largest number of short-term jobs, up to

**1,500**

but the most long-term jobs are in biomass, cookstoves and solar PV (**200-300 jobs per project**)

## CONTEXT

Over 60% of the population in Sub-Saharan Africa is under the age of 25 and the number of African youth is expected to double to over 830 million by 2050.<sup>1</sup> A high proportion of young people can offer a demographic dividend that increases national growth, but this asset needs to be fully capitalised through jobs and other economic opportunities.

Youth unemployment is a significant and growing problem in the region. The large youth bulge means that 10 to 12 million young Africans are entering the job market each year and yet only about 3 million formal jobs are being created annually. Young women are even more negatively affected by unemployment than men. Across the continent, 35% of female youth are not in employment, education, or training, compared with only 20 percent of men.<sup>2</sup>

Recent studies by the African Development Bank and World Bank<sup>3</sup> have looked at these challenges in-depth. Some of the factors contributing to high unemployment rates among youth in Africa include a lack of access to high quality education and skills discrepancy between educational institutions and the job market. The lack of salaried jobs in urban areas is also pushing many youth into the informal sector, where work is typically less stable and provides lower levels of income. For rural youth, the impact of climate change on agriculture is diminishing economic opportunities.

The clean energy sector generates significant direct employment opportunities throughout its value chains, and these are greater than those of conventional energy sources.<sup>4</sup> According to the International Renewable Energy Agency (IRENA), the off-grid value chain alone, including sales, marketing, installation and services, could create at least 4.5 million jobs globally by 2030. While the estimated employment in the clean energy sector in Africa is still modest, with just 322,000 jobs across the continent, the sector is growing rapidly.<sup>5</sup> The African Development Bank has identified renewable energy and related technologies as one of the main drivers of the Fourth Industrial Revolution.<sup>6</sup>



Vitalite, EEP Africa's 2018 Project of the Year, created jobs for youth as rural sales agents while pioneering PAYG solar in Zambia.

<sup>1</sup> UNFPA, *State of the World Population 2019*

<sup>2</sup> African Development Bank, *Jobs for Youth in Africa: Improve the Quality of Life for Youth in Africa*

<sup>3</sup> World Bank, *The Future of Work in Africa 2019*

<sup>4</sup> EUEI, *The Employment Effects of Renewable Energy Development Assistance*

<sup>5</sup> IRENA, *Renewable Energy and Jobs 2019*

<sup>6</sup> African Development Bank, *Creating Decent Jobs: Strategies, Policies and Instruments*

## From Back Office to Project Manager

After completing a degree in Banking and Finance, Alicia Rutajumbukilwa was looking for a job. Instead of ending up at a local bank, like many of her peers, Alicia (right) was hired by Ensol Tanzania to handle office operations and petty cash management for a solar home systems project in Lushoto, Tanga Region. Ensol provided her with basic knowledge about solar technology and the chance to attend energy-related workshops, trainings and conferences. Her responsibilities eventually expanded to include community awareness, training, and recruitment of new beneficiaries. Alicia realised that many Ensol customers wanted the capacity to use the energy for home micro-businesses and other productive uses, but this was not possible due to the size of the systems. While brainstorming with top management, the idea of implementing mini-grids was born. Alicia began conducting pre-feasibility surveys for mini-grids in rural villages and Ensol secured financing to implement a 48kW solar hybrid mini-grid system in Mpale. In the new project Alicia held the position of Project Development Manager, responsible for overseeing all project operations with the help of a team of five other staff. Alicia has participated in surveying 15 more villages, which are now in the pipeline, and is raising finance for scale-up. Working at Ensol has given Alicia the chance to learn new skills, identify challenges and solutions, and directly impact people's lives.



# KEY INCOME OPPORTUNITIES FOR YOUTH

Based on observations from the EEP Africa portfolio and data from recent studies, the following categories of jobs have been identified in the clean energy sector that are most relevant and accessible for youth:

## Direct Energy Generation and Distribution:

- Design and construction
- Sales and marketing
- Technical installation, repair and maintenance

## Productive Use of Energy:

- Agricultural
- Service and entrepreneurial

In the sections below, specific opportunities in each category are described. These are demonstrated by brief case studies from EEP Africa's comprehensive clean energy portfolio of 250 projects.

## Jobs in Direct Energy Generation and Distribution

### Design and Construction

The construction of renewable energy power plants (hydro, wind, solar) often creates a large number of short-term jobs. Recent data on employment generation by South Africa's Renewable Energy Independent Power Producers programme indicates that 60% of total jobs in the sector are related to construction. Over 90% of these jobs are for skilled labour, providing high quality decent jobs for people with a vocational or university education.<sup>7</sup>

Qualified construction teams consisting of civil, mechanical and electrical engineers with specialised knowledge of clean energy technologies are needed to design and oversee construction of a power generation plant. Many African countries are hampered by a widespread shortage of engineers and technicians in all parts of the renewable energy industry, thus opening opportunities for qualified youth to enter this sector.<sup>8</sup> Skilled labour is also needed for electrical and grid work. In the building phase, semi-skilled labour is required to carry out civil works (such as site clearing, foundation and basic construction) while unskilled labour is used for transportation of equipment.

East Africa Power, in partnership with Practical Action constructed a 445kW run-of-the-river containerised hydropower plant in a rural area of Rwanda in 2018 with support from EEP Africa. The plant utilises the water flow from the Rubagabaga River to generate clean electricity for both the local community and the national grid. During construction, the project directly employed more than 1,500 locals, over half of whom were youth. The partners followed a labour intensive mode, relying on human power for activities like digging, cutting, crushing and transporting materials. They also promoted engineering skills transfer by having experienced

<sup>7</sup> Institute for Advanced Sustainability Studies Potsdam and Council for Scientific and Industrial Research, *Future skills and job creation through renewable energy in South Africa Assessing the co-benefits of decarbonising the power sector*

<sup>8</sup> European Union Energy Initiative, *The Employment Effects of Renewable Energy Development Assistance*

international engineers work alongside young local engineers to enable on-the-job training. Now that the plant is operational, additional long-term jobs are being created by a local business hub connected to the new power supply.

(Zimbabwe). Young people are also preferred for these jobs because many SHS distributors utilise digital and mobile technologies (smart metering, PAYG) to run their sales and marketing operations and youth are often more digitally savvy.

## Sales and Marketing

Youth participation in the distributed clean energy sector is already high. According to the recent *Powering Jobs Census* by Power for All, an EEP Africa partner, youth constitute 40% of the sector in Kenya, with two-thirds engaged in sales and distribution.<sup>9</sup> They have a particularly large representation in the sales workforce of solar home systems (SHS) and cookstoves. The role of young women should be highlighted as they often outperform their male counterparts in the sales phase of energy value chains.<sup>10</sup> Consequently, increased attention to opportunities for women in sales, marketing and other types of jobs in the sector is important to strengthening gender equality and generating revenue.

While some projects establish central customer service stations, rural distribution generally requires a large number of on-the-ground sales agents. According to an EEP Africa study of Solar PV Business Models in East Africa, a SHS business selling 100,000 systems per year through pay-as-you-go (PAYG) requires about 800 rural sales personnel (considering an average of 10 sales per month per agent). Since sales-related jobs do not require in-depth technical skills, agents can be easily trained in-house by a company. Some EEP Africa-financed companies that run successful in-house training programmes targeting youth include the cookstove provider Livelihoods (Kenya) and SHS companies SolarWorks (Malawi, Mozambique) and Zonful

SolarWorks, a SHS company active in Malawi and Mozambique, employs over 90% youth in their country offices. Young people normally enter the company as a sales agent to become familiar with the company's products and customers. Successful sales agents can further develop their skill sets and be promoted to managerial positions in which they coordinate a team of sales agents. With EEP Africa financing, SolarWorks opened three sales hubs in Mozambique, becoming one of the first SHS PAYG providers in the country. The approach focused on door-to-door sales to reach customers in surrounding communities based on in-house training and a bonus system to motivate and retain employees. Within one year after the project ended, SolarWorks had scaled up to 10 sales hubs, employed 200 people and completed nearly 10,000 SHS sales. A second grant from EEP Africa is enabling the company to expand operations into Malawi.

<sup>9</sup> Power for All, *Powering Jobs Census 2019: The Energy Access Workforce*

<sup>10</sup> EEP Africa, *Understanding the Role of Women and Girls in Renewable and Energy Efficiency Projects*



## Finding a Community and a Career

Kalistus Msafiri was new in Ifumbo, a small town with a population of less than 6,000 in the Mbeya Region of Tanzania. With no local network, he struggled to find a job and integrate into the community. His job search was especially difficult because his formal education ended at a lower-secondary level and he had no other professional training. When Kalistus was 21 years old, he saw that Devergy was setting up one of its mini grids in Ifumbo. He had an interest in modern technology and followed the development of the project closely. When Kalistus learned that Devergy was interested in recruiting a Local Technician, he immediately expressed interest in the position. As a result of his eager attention, Devergy invited him to join their in-house training program. This opportunity transformed his life. Kalistus has now worked as a Local Technician for three years and is recognised as an important member of the community. With the regular monthly income he earns from commissions, he has been able to buy a plot of land for him and his wife, who he met through his job. Kalistus now dreams of building on his technical knowledge to start his own business selling phones or modern appliances.



## Technical Installation, Repair and Maintenance

The number of clean energy mini-grids and stand-alone systems in use throughout Africa is constantly growing. This creates a high demand for skilled technicians to manage installation, as well as provide on-going maintenance and repair services. Many mini-grid developers own and operate multiple systems located in remote rural areas across a region or country. It is often too costly to service these grids through a centralised technical team. Therefore, most companies prefer to use a network of local technicians employed on a part-time or commission basis.

In many countries, however, there is a shortage of sufficiently skilled technicians in remote areas. Kenya currently has only 2,100 certified engineers to serve 45 million people.<sup>11</sup> Some mini-grid developers are addressing this issue by collaborating with vocational training institutes to recruit technicians. Others are setting up their own local or online training programmes to upskill rural mechanics.

An EEP Africa study on *Opportunities and Challenges in the Mini-grid Sector in Africa* noted that a key success factor for rural mini-grids is to recruit a local maintenance team, with an emphasis on youth, and to invest in training to fill gaps in technical knowledge. For example, Zola Electric (formerly Off Grid Electric) established an academy in Arusha, Tanzania to train youth. The rapid technological development taking place in the mini-grid sector related to smart-metering and remote management technologies will require even further technical skills from the maintenance teams.

**Kumudzi Kuwale, a Malawian social enterprise providing basic lighting services to off-grid communities, is running an on-going internship programme in partnership with a local vocational**

**training college, Nkhotakhota Youth Association. Through this programme, Kumudzi Kuwale provides short term placements for recent electrical engineering graduates. Interns that perform well are offered employment as technicians in the company.**

## Jobs in Productive Use of Energy

### Agricultural

Rural mini-grids and equipment that use renewable energy to foster climate resilient agricultural practices help improve the income potential of rural households and opportunities for rural youth. If young people see a sustainable future for themselves in farming, this will stimulate rural development and fewer will move to urban areas. Clean energy products that increase productivity, such as agro-processing machinery and solar stand-alone systems, can help turn a subsistence farm into a small agri-business. Increased productivity in the agricultural sector also creates growth that can lead to job creation further down the agricultural value chain, such as packaging and transportation.

EEP Africa-financed companies are currently providing clean energy agricultural products such as irrigation systems (Celfre Energy and SunCulture) and milling equipment (Agsol) and biomass (Village Industrial Power). Solar water pumps, for example, offer the opportunity for smallholder farms to switch from rainfall dependent agriculture to irrigation-based agriculture. This brings improved productivity, climate adaptation, and a significant increase in household income. By adding on affordable financing mechanisms, distributors are lowering the barrier for renewable energy uptake.

<sup>11</sup> *Daily Nation*, "Kenya Faces Shortage of Certified Engineers", 8 June 2017



SunCulture is a Kenya-based company specialising in solar pumping, irrigation and technology solutions. Their range of products enable rural and smallholder households, many of which are women-led, to improve productivity and expand the number of growing seasons and land under cultivation. This has increased household income by as much as 5-10 times. SunCulture's financing platform "Pay as You Grow" aims to close the financing gap for productive use agricultural appliances, which is a major barrier for rural development.

Page 18:  
SunCulture is bringing solar irrigation to farms in Kenya, enabling young people to envision a productive future for themselves in rural areas.

### Service and Entrepreneurial

Mini-grid developers and other energy service companies are increasingly focusing efforts on promoting productive uses of energy to increase demand and optimise the generation potential of their systems. As in the agricultural sector, these efforts often include providing access to energy efficient appliances and offering credit or lease-to-own financing to make the appliances more affordable. Many companies are also working with partners to provide business development support or entrepreneur skills training to enhance uptake of productive uses of clean energy.

The increased focus on productive use of energy, coupled with the decreasing costs of technologies, provides new opportunities for youth to start micro businesses in the service sector, especially in remote areas. Numerous EEP Africa projects have shown that an electrified village can become a business

hub, stimulating the creation of small enterprises such as workshops, kiosks, hair salons, internet cafes and restaurants. The impact can also extend beyond the physical distribution network through battery charging stations and other “virtual mini-grids.” Zembo, a youth-led start-up in Uganda, is bringing rechargeable solar batteries to the transportation sector through electric boda-boda motorcycles that are creating green jobs and reducing CO<sub>2</sub>e emissions.

Absolute Energy (AE) installed a mini-grid in a fishing community on Kitobo Island in Uganda. The system generates 400 Mwh of clean energy per year, powering 90% of local homes and a range of productive activities. AE collaborated with village savings and loan schemes to provide financing and partnered with AVSI Foundation to provide business development support and build local capacity. The new businesses that developed have created jobs and diversified the local economy, thus opening opportunities for local youth beyond fishing.

Page 21:  
A young man on Kitoba Island opened a small business thanks to the clean and affordable electricity generated by Absolute Energy’s mini-grid.



## Choosing Kampala over Silicon Valley

Titus Kimbowa moved to the US when he was 12 years old. He studied economics at university and then went to work in Silicon Valley. He was employed at several different tech companies and experimented with entrepreneurship by developing his own start-up. When he was in his mid-twenties, Titus (second from right) visited Uganda for the first time since his family had left. It opened his eyes and inspired him to have a larger impact in the world. He felt that the tech industry in the US had lost sight of problem solving at a human level and that projects working towards a higher goal, a better world, need to be amplified. Titus moved to Kampala and soon met another young entrepreneur, Daniel Deher, who had an idea to introduce solar-powered motorcycles into the boda-boda market. The first fleet of motorcycles designed and produced by their start-up company, Zembo, are now on the street. Their ability to innovate and test new products is helped by pro-clean energy policies in Uganda, such as zero tariffs on the import of solar equipment, including batteries. Titus and his colleagues have big plans for the future – they are in talks with the Kampala city authorities to scale up electric mobility and help make the city a more liveable space for everybody. Though many young people in Africa see Silicon Valley as a land of opportunity, Titus has found a more inspiring career path in Kampala.



## BARRIERS TO YOUTH EMPLOYMENT IN CLEAN ENERGY

It is clear that there are large and growing opportunities for young people in the clean energy sector in Africa, but there are also barriers preventing youth from fully capitalising on them. Based on available research and interviews with EEP Africa project developers, the key barriers mainly relate to bridging the gap between education and work:

**Academic Qualifications:** There is a lack of accessible and affordable education or training that is relevant, high-quality and meets the needs of industry, especially in rural areas. Many African countries are hampered by a widespread shortage of qualified engineers (civil, mechanical and electrical) and technicians. An extensive shortage of qualified trainers with these skills has also been identified.

**Soft Skills:** A large proportion of educated youth are trained as auditors, lawyers or finance specialists but they lack the business and leadership skills (such as innovation, strategic planning and communication) needed to further develop the sector.

**Awareness:** There is a lack of awareness among youth about opportunities in the clean energy sector and no established pipeline for recruitment.

**Support:** Youth entrepreneurs lack access to start-up capital and other financing. Young employees lack mentors and targeted business networks in the clean energy sector.

Zonful, a leading SHS distributor in Zimbabwe, is playing an active role in improving education courses focused on the renewable energy sector. The company engages with Zimbabwean universities to provide input to the national curriculum for off-grid renewable energy to ensure it meets industry needs and provides lectures on job opportunities and general trends in the sector. The company sees clear benefits of employing youth and actively recruits youth locally, especially young women, so they can act as role models for other young people in their village.



Zonful is bringing solar home systems to new regions of Zimbabwe through its young, women-led sales network.

## Becoming an Investor

Faith Chege studied International Business Administration in Nairobi, Kenya. Many of her fellow students went into the banking sector, but Faith (right) was drawn to a career with a social purpose and began working for an environmental NGO. Within a few years, she became frustrated with how grant funds were managed and began looking for an opportunity to use donor support more efficiently. In her mid-twenties, Faith joined Barefoot Power as a Finance and Grants Officer. She appreciated that grants are used to pilot market-based solutions with the goal of developing viable business models that can attract equity financing. Faith eventually became the Chief Financial Officer and was awarded a Mandela Washington Fellowship by the Young African Leaders Initiative. During the fellowship, she heard a speaker say that there was more financing available in the renewable energy sector than there were projects to finance. Reflecting on her own experience, Faith realised that investors and those who need investment often move in different circles. She saw that her experience at a social enterprise could be valuable to investors and was motivated to move to the other side of the funding table. Faith now works as the East African Venture Associate at Factor[e] Ventures, a venture capital firm that invests in early stage agriculture, sanitation, mobility, and energy companies.



## DEVELOPING GREEN GROWTH PATHWAYS FOR YOUTH

Young people working in the clean energy sector confirm that there are many opportunities for professional growth and development once they enter the market. To overcome some of the barriers that are preventing youth from entering the sector, the following interventions are suggested:

### **Increase collaboration between industry and educational institutions.**

- Raise awareness among students through presentations by industry players at educational institutions that highlight the job opportunities and required skills sets.
- Co-design modules that focus specifically on technical skills that are in high demand in the clean energy sector.
- Set up apprenticeships or internship programmes providing the opportunity for graduates to gain work experience in clean energy companies.

### **Improve the quality and accessibility of training.**

- Enhance national certification processes and requirements for industry training programs to ensure that they follow appropriate guidelines and meet international standards.
- Develop more public training initiatives to help transform the workforce, in addition to programs driven by the private sector.
- Make training programs accessible in rural areas, either through provincial training colleges or digital models, to help modernise the agricultural sector.

### **Build an external pipeline of youth candidates.**

- Engage directly with formal education institutions to improve youth engagement. This may be a feasible option primarily for larger companies due to often high cost implications.
- For smaller companies, engage with local renewable energy associations or industry associations, like AMDA or Gogla, to establish an external pipeline that brings educated youth into the decentralised renewable energy workforce.

### **Invest in and support youth entrepreneurs.**

- Alleviate constraints on start-up capital through grants and affordable loan finance programmes.
- Strengthen local and regional innovation hubs and accelerator programs that support entrepreneurs.
- Expand the quality and reach of innovation support programmes. There is a gap in rural areas and slow growth industries, such as agribusiness, as current activities mainly focus on high-growth entrepreneurs.



## Regional Initiatives

The SADC Centre for Renewable Energy and Energy Efficiency (**SACREEE**) established the Renewable Energy Entrepreneurship Support Facility, in partnership with IRENA. The facility aims to strengthen the capacity of renewable energy entrepreneurs and translate innovative ideas into viable business models. Entrepreneurs are invited to apply for technical support in refining project proposals to reach bankability or developing skills through mentorship and training. The first call for applications was opened in 2019.

The East Africa Centre for Renewable Energy and Energy Efficiency (**EACREEE**) is working with partners to establish programmes that build capacity in the sector, e.g. the Micro-Grid Academy and Solar Energy Academy. The focus is on building capacity for design, production, installation and maintenance of various renewable energy technologies. EACREEE aims to establish an energy entrepreneurship fund for women, youth and marginalised persons to facilitate access to finance.

The African Development Bank (**AfDB**) launched a Jobs for Youth in Africa (JfYA) initiative that aims to create 25 million productive jobs for youth by 2025. The initiative will include three new programmes in agriculture and two programmes in ICT. These include an Information and Innovation Lab and an Africa Agribusiness Incubators Network. The agribusiness network is establishing at least 108 incubators in 54 African countries over the next five years focusing on youth and women. The plan is to expose 60,000 students to the “learn as you earn model” and mentor them to start new businesses.



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Livelihoods is creating job opportunities for unemployed youth and women in Kenya as sales agents and local branch administrators.

Disclaimer

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