

Exploiting mini-grid power in Uganda: policy recommendations

VET Toolbox project: training of solar technicians and communities



The VET Toolbox programme aims to improve the effectiveness of vocational education and training systems in selected sub-Saharan African countries by making them more opportunity-driven, turning investments into drivers for inclusive economic growth, social development and decent job creation. It is co-funded by the European Union (EU) and the German government (BMZ), and implemented by the British Council, Expertise France, GIZ and LuxDev. GIZ is implementing the VET Toolbox in Kenya, Mozambique, Nigeria, Tanzania, and Uganda.

Context

Uganda, keen to become a model country for renewable energy, and having made clean energy a cornerstone of its Vision 2040 National Development Plan (NDP) – in fact, it wants 100% of its population to access electricity by 2040, where only 57% do now. It is investigating various options: green hydrogen, liquefied petroleum gas (as a transitional energy source), geothermal energy and wind. But the country recognises that solar – supplied on a local level – offers the most effective way forward, with renewable, off-grid local power generation the clear solution.

Solar-powered mini - grids - standalone photovoltaic installations that can each power over 200 households and small businesses - offer a reliable (and clean) electricity supply and entrepreneurial opportunity to communities that have never before enjoyed such advantages as safe lighting and heating, refrigeration, power tools and even online access (according to the World Bank, only 10% of Ugandans currently access the internet). The introduction of electricity to

isolated rural communities in particular is nothing short of transformative.

The Promotion of Mini-Grids for Rural Electrification project, which was established before the VET Toolbox initiative, has already seen the installation of 25 mini-grids in rural areas and there are plans for 600 more. However, its success depends on two things: the creation of human capacity – skilled solar technicians (and their trainers) – to install, operate and maintain the mini-grids; and the education of consumers around the productive use of electricity (PUE), in order for them to safely and profitably harness this renewable source of energy, as well as the provision of start-up subsidies to purchase much-needed electrical appliances for their businesses.

The VET Toolbox initiative in Uganda was therefore implemented to complement and support the mini-grids project, ensuring its success by addressing the human capacity needs that go along with it.





VET Toolbox is a multi-donor action taking shape in 11 African countries. The programme is co-financed by the European Union and Germany's Federal Ministry for Economic Cooperation and Development (BMZ). The action is implemented by Enabel, the Belgian Development Agency, along with the Luxembourg Agency for Development Cooperation (LuxDev), the British Council (BC), Expertise France (EF) and GIZ. In addition to Uganda, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH's Employment Skills for Development in Africa (E4D) programme implements VET Toolbox actions in Kenya, Nigeria, Mozambique and Tanzania.

This opportunity-driven action aims to turn concrete investments into drivers for inclusive economic growth, social development and job creation. To prepare the ground for such investments, such action aims to build the capacity of players in the national VET sector and in the wider labour market. These players include

training providers, employers, public actors, trainees, students and labourers.

The VET Toolbox project in Uganda has got off to a flying start – indeed, a total of 31 solar technician and PUE trainers, 101 solar technicians and 346 PUE beneficiaries have already been trained, exceeding set targets. Overall, 101 solar technician and advanced operations and maintenance (O&M) technician trainees (38 % female) have successfully completed the training. Of them, 65 (34% female) have taken up internships, with another 20 (11 male and nine female) securing employment. 44% of the PUE community trainees were women far exceeding the 35% female target.

But for Ugandans to fully embrace renewable energy, and the mini-grids model to be rolled out sustainably to fulfil the NDP, a robust policy environment is needed. This document makes policy recommendations that support both.

Policy recommendations

Policy recommendation 1: expedite initiatives to facilitate productive use of electricity from mini-grids

Only 19% of Ugandans, chiefly in urban areas, access electricity from the national grid, which distributes hydro-electric power primarily, but also fossil-fuel power. Another 38% access renewable energy via standalone mini-grids and solar home systems, harnessing this equatorial country's abundant sunlight. Forty-three percent of the Ugandan population is thus without access to electricity at all – hampering efforts to bring socio-economic development and human upliftment in the country.

According to the World Bank's online data pages for Uganda, 42.2% of citizens live on less than \$2.15 a day (at 2017 purchasing power-adjusted prices). Uganda's human capital index, used by the World Bank to measure a country based on its people's survival, education and health, rates Uganda as 0.4 on a scale of 0 to 1, putting it in the bottom 20% of countries measured.

In addition to the economic benefits of greater electrification using renewable energy, there are health and environmental benefits, too. More than 90% of the five million households that do not access the grid use biomass for cooking, which causes air pollution and the unsustainable depletion of Uganda's forest cover. But because rural communities are isolated and scattered,

connecting them to the national grid and more sustainable energy usage is both impractical and not financially viable.

While solar energy is already the primary form of energy to nearly four in 10 Ugandans, it remains an expensive option, particularly for the rural population that needs it the most – and it is costlier than hydro-electric power, enjoyed by the 19% of Ugandans who can access the national power grid. The equation is clear, and the VET Toolbox project has seen it in practice: giving more Ugandans access to solar power equates to more economic opportunity and more social upliftment than they would otherwise enjoy. The more people get access, the better the equation will work – but that means solar must be an affordable option compared with other forms of power, from hydro to biomass.

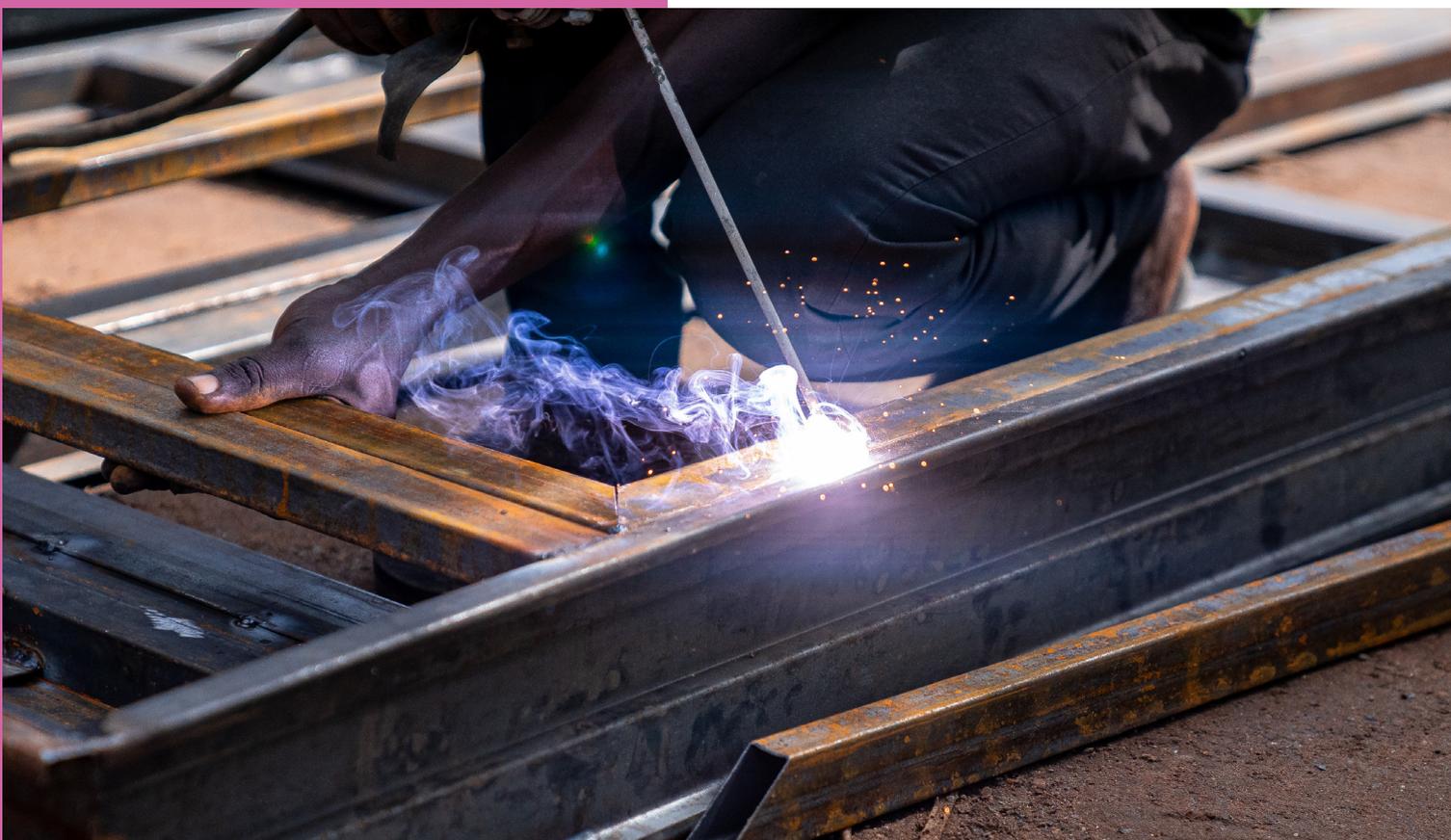
It thus stands to reason that the mini-grids sustainable energy model will only really succeed the more people use it and benefit from it, and continue to do so well into the future. But to persuade them to embrace a comparatively expensive energy source (at least, in terms of outlay) requires commitment and a clear policy direction from the Ugandan authorities.





Recommendations

- Prioritise PUE initiatives to get more Ugandans using sustainable electricity. This includes the training of trainers; training communities on how to make the most out of a power supply, as well as on business skills; and providing further mentoring and coaching measures to communities
- Train more up-country solar technicians, and O&M technicians – in other words, where they are needed – to reduce installation and maintenance costs for solar companies and ensure the continuous supply of clean energy to users in rural areas
- Facilitate access to finance credit schemes or subsidies. It is through accessing such schemes that businesses can obtain necessary equipment to expand: for example, a freezer in a food business, or electrical clippers for a barber, will transform their operations. (This includes the extension of credit schemes to communities)





Policy recommendation 2: formalise work-based learning approaches (industrial attachments, traineeships, internships)

Training of trainers is vital for training technicians long after the VET Toolbox project has been completed. Also, training beneficiary communities encourages investment in mini-grids, as those communities will use (and therefore create demand for) such infrastructure.

Training for solar technicians, as provided by the VET Toolbox project in a centre-based workshop environment, builds an essential skill set for trainees. But there is ultimately no substitute for practical experience gained at the workplace, which is why work-based learning opportunities for them in the renewable energy sector should be a matter of VET national policy.

Companies working in renewables, in particular solar energy, should be supported to offer work-based learning opportunities to trainee technicians to drive optimal practical skill and professionalism. The Ugandan government should make it a priority to work with industry bodies and their member companies, in particular solar energy providers, to drive standards for quality work-based learning and desirable practices within the renewable energy sector.

The benefits of work-based learning are manifest: trainee technicians gain the essential practical skills they need to transition from the classroom to the world of work, and are introduced to prospective employers; solar mini-grid beneficiary communities enjoy uninterrupted power supply; O&M overheads can be minimised; private companies create a deep pool of skilled technicians; and Ugandan economic growth is stimulated.

Recommendations

- Review and update existing VET laws, and enact legislation, around work-based learning to promote the creation of internships and traineeships
- Make internship a compulsory part of solar technician, and basic and advanced O&M, training at VET institutions. This would expose trainees to the practical realities of their work, and employers to a pool of prospective employees
- Promote internship and other work-based learning through industry associations and business bodies, particularly those concerned with sustainable business and renewable energy

Conclusion

Uganda has the potential to become one of the world's leading users of renewable energy, and its focus on sustainable energy as part of its Vision 2040 National Development Plan is to be applauded.

Key to this ambition are two elements: first of which is the distribution of electricity. Uganda's decision to promote the installation of off-grid, photovoltaic mini-grids as an affordable, practicable alternative to trying to connect far-flung, isolated communities to the national grid, ultimately promises the provision of power to every Ugandan, including the 43% who have never enjoyed electrical power.

The second element is PUE, the productive use of electricity. It is both financially and physically risky to provide communities who have never worked with electricity, with such energy. For them to make the most out of their newly provided electrical power, and obviate the dangers of that power, it is necessary to provide communities with the basic training they need. It is often said that knowledge is power; here, knowledge of power is power.

Critical to the overall success of this approach are two factors. The first has to do with the theoretical and practical training of skilled technicians to install, operate and maintain the solar mini-grids, hundreds of which are being planned. Without the right people with the right skills to make the mini-grids work, the project is bound to fail. Secondly, solar power should be a competitive energy technology in order to drive public uptake and support the mini-grids' viability.

The two policy recommendations mentioned above each support one of these factors. By promoting technical excellence and product affordability, the Ugandan government will go a long way towards ensuring that solar mini-grids bring power to all of its people.





Thank you.

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