Market Map 2021: Foreword by the Ministry of Energy and Mineral Development

The last year has been a challenge for the citizens of Uganda. The COVID-19 pandemic has restricted movement, limited economic activity, and adversely affected many. Coming out of the COVID-19 pandemic, it is more important than ever to ensure that the citizens of Uganda have access to clean, affordable, and modern electricity. Intermittent lockdowns which kept people at home highlighted the importance of having access to energy.

The Government of Uganda is more committed than ever to support increased energy access across the country. We recognize that mini-grids will play a vital role for the sector, and we implemented the isolated mini-grid system regulation to ensure an effective framework for the private sector that provides surety for development. We also adopted IEC technical standards for solar home systems to eliminate counterfeits and level the playing field. The government also recognizes the potential of productive use of energy to boost livelihoods and support a more resilient recovery from the impacts of COVID-19. To support the private sector’s efforts, the Government is developing a productive use of energy strategy that will outline current gaps and also identify ways that government can support the industry.

We recognize that the important work of this sector cannot be done by Government alone. We must work with a coordinated group of private sector, with financiers, with development partners, and with ecosystem players and industry associations. The work by industry stakeholders such as the Uganda Off-Grid Energy Market Accelerator (UOMA) is vital to ensure that the sector can keep up its momentum. UOMA’s annual Market Map publication provides a fresh perspective on the current state of the off-grid energy sector in Uganda.

Sincerely,

Eng. Irene Pauline Batebe
Permanent Secretary
Ministry of Energy and Mineral Development

UOMA
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The Uganda Off-Grid Energy Market Accelerator (UOMA) is a dedicated and neutral intermediary, focused on scaling off-grid energy access through 5 core initiatives

UOMA started in 2017 and is focused on supporting sustainable & universal access of affordable clean energy for Ugandans

The Uganda Off-Grid Energy Market Accelerator (UOMA), implemented by Open Capital in partnership with the Shell Foundation, FCDO, USAID, and Power Africa, completed a 5th successful year, growing from an early catalyst for innovation to being a trusted partner and central advisor for off-grid energy access in Uganda.

Through this pioneering concept, we are coordinating industry actors, providing technical input, expertise and substantial support for private and public sector strategies to drive towards SDG 7 and universal access of affordable and clean energy for Ugandans.

UOMA serves a distinct function by 1) being independent & neutral, 2) having a local team with responsive capacity focused on results, and 3) providing access to cross-sector stakeholders. This ensures that UOMA complements and accelerates other Ugandan off-grid energy initiatives.

Since 2017, our activities have been focused on 5 core initiatives

Expanding access to finance for solar operators through increasing local currency debt and bridging a critical working capital shortfall and currency mismatch, enabling operators increase affordability of units

Reaching unserved populations by reducing barriers to better target low income households in Uganda, improving access for some of the hardest to reach communities

Expanding productive use technology through supporting the industry to test and validate technologies that can achieve economic benefits for off-grid Ugandans while growing energy demand

Strengthening the enabling environment by supporting the public sector to create effective policies and a conducive environment to increase off-grid energy uptake in Uganda

Facilitating communication & coordination in the off-grid energy sector in Uganda, resulting in better resource allocation and accelerated progress in achieving universal access
UOMA is run by a technical team supported by a cross cutting senior advisory board representing government, private sector, and development partners

Core Technical Team

The technical team is composed of a variety of professionals with regional and national experience including off-grid energy finance, distribution, business models, bank finance, economics, public relations, marketing and others. The team has experience working with regional consulting firms, statutory bodies in Uganda and government agencies. This provides a wide range of skills that can be relied on to effectively implement UOMA’s initiatives.

Locally implemented by Open Capital Advisors (OCA), who bring deep sector expertise and local Ugandan execution capability

Advisory Board

Through our comprehensive industry insights, our local team based in Kampala, and the Advisory Board, which comprises of senior sector stakeholders, we have quickly built relationships and achieved close working relationships with government, private sector and development partners, enabling us to connect stakeholders and present a diversity of perspectives. Senior representatives from key cross-sector stakeholders make up the Advisory Board, across government, development partners, and the private sector:
Over the last 5 years, UOMA has published more than 15 research pieces, supported capital raises of more than USD 30 M, and facilitated over 125K new connections.

<table>
<thead>
<tr>
<th>Direct interventions</th>
<th>Research &amp; insights</th>
<th>Independent coordination</th>
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<tbody>
<tr>
<td>15+ Innovative pilots enabled to reach unserved areas and scale prod. use tech</td>
<td>15+ New, influential research pieces &amp; insights</td>
<td>5 Annual versions of market map, now an industry-standard, landmark “go-to” document relied upon by sector</td>
</tr>
<tr>
<td>125,000+ New connections from pilots for UG’s hardest to reach</td>
<td>10,000+ Downloads of market map across Uganda and globally</td>
<td>400+ Annual individual interactions - with investors, development partners, several others - outside of core activities</td>
</tr>
<tr>
<td>5+ New key gov’t papers informed and influenced</td>
<td>87% Feel UOMA helps to improve market transparency</td>
<td>Local expert team works closely with sector actors to collaborate on and facilitate several targeted workshops and matchmakings</td>
</tr>
<tr>
<td>$30M+ Capital deployed following deal-focused TA to local financiers and operators</td>
<td>60% Believe UOMA positively facilitates sector deals</td>
<td></td>
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</tbody>
</table>

More of UOMA’s research can be found here: uoma.ug
In 2021, UOMA published 4 research papers, and had 8 direct interventions with operators and lenders leading to USD 2M+ in fundraising

**Thought leadership & sector coordination**
- Performed an *in-depth review of the draft national PUE program strategy* at the request of the Renewable Energy Department of the Ministry of Energy
- Conducted a *detailed review of the European Union’s energy distribution sector reform paper* outlining market interventions to enable more effective use and regulation of distributed energy resources (DERs)
- Led *sector coordination to explore immediate and medium-term impact of COVID-19 on Uganda OGS sector*, supporting UNREEEA and USEA
- Participated in several inter-sector and intra-sector coordination efforts, particularly with public sector

**Market research & insights**
- Published a *whitepaper on the impact of COVID-19 on access to finance* for local off-grid companies
- Published a paper on PUE learnings from extensive pilot work
- Published *white paper on the demand side barriers on access to finance* for off-grid solar businesses in Uganda

**Technical assistance**
- Extended *technical assistance to the off-grid energy team for a regional bank* to deepen their understanding of the renewable energy sector and build a pipeline of loans
- Supported *local PUE operators with their growth strategies*, for example to outline a market growth strategy for rural healthcare electrification
- Successfully supported *investment readiness and $2m+ fundraises* for 3 locally-owned mini-grid developers and productive use of energy companies
This Market Map, comprised of 3 sections, seeks to provide a holistic and objective description of the off-grid energy industry in Uganda

**Objective of the Market Map**
As part of our goal to promote more cohesion and coordination in the market, UOMA releases a Market Map annually to provide a holistic & objective description of the off-grid industry in Uganda to better inform innovation, interventions, and resource allocation.

This edition highlights trends within the sector, details the impact of sector interventions, and recommends opportunities for further support to the market, focusing on 3 key segments: Solar Home Systems (SHS), Mini-grids (MG), and Productive Use (PUE).

**Methodology**

**Data collection & analysis:** This report is a culmination of data obtained from dozens of consultations with key private & public sector stakeholders and data obtained from pilots & research with operators, gov’t & financiers

**Validation & publication:** Prior to publication, this report was also peer reviewed by >20 stakeholders to validate findings and verify data presented

**Industry insights**

**Industry update**

The Market Map provides a comprehensive overview of the off-grid market in Uganda with 3 sections:

- Gives an overview on the key trends in the off-grid landscape for each segment and highlights primary barriers to scale. It also provides an update on key changes within the enabling environment and the funding landscape.

- Presents data-driven analysis to provide context & trends of off-grid development; outlines key barriers to growth, opportunities for innovation & stakeholder support

- Presents information detailing stakeholders & activities currently active across in the Ugandan market, covering the private sector players, NGOs, financial institutions, government and development partners
Industry update
Solar Home Systems: Sales volumes declined as companies pivoted business models to remain afloat; low access to finance continued to hinder growth

Sales drastically fell due to impacts of the COVID-19 pandemic on the Ugandan economy and stringent government lockdowns

- Sales improved after easing of restrictions in the first lockdown in H2 2020, but a second wave of restrictions in H1 2021 hampered sector recovery and depressed sales

Technical assistance providers offered subsidized support to fast-track recovery

- GET.Invest supported both existing and new clients to restructure
- Finding XY supported OGS SMEs with investment readiness
- UOMA provided bespoke investor readiness and strategy support

Companies utilized digital tools, prioritized cash sales and pivoted business models to remain resilient

- Prioritized cash sales over credit sales to shore up cash flows; cash sales increased by 83% in H2 2020 compared to H1 2020 while PAYGO sales decreased by 24% in the same period
- Pivoted business models both laterally and vertically to diversify risk and free up cashflows; PAYGO operators e.g.,
  - Companies like Anuel Energy and some PAYG companies are shifting emphasis to PUE models, and expect to see more sales in these product lines over the next 2 years
  - While some operators started selling modular systems, assembling products locally to address import challenges like price spikes and shipping container scarcity
- Leveraged digital channels like social media to keep customer acquisition costs low; companies transitioned employees to call centers and focused on existing customers during the lockdowns

However, limited access to finance still restricts market growth

- Local financiers are hesitant to invest in operators given uncertainty of business operations
- Investors are more inclined to support large operators with proven business models and traction, limiting the pool of companies that can receive funding

Mini-grids: A few mini-grids have been commissioned and several are under construction, though delayed; the sector outlook is promising but barriers persist

<table>
<thead>
<tr>
<th>Type of mini-grid</th>
<th>Existing*</th>
<th>Upcoming</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bio-gas</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Hydro-power</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Solar powered</td>
<td>9</td>
<td>51</td>
</tr>
<tr>
<td>Solar-diesel</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19</strong></td>
<td><strong>61</strong></td>
</tr>
</tbody>
</table>

A few mini-grid projects have been commissioned recently

- UNHCR commissioned a 10.8 kW solar PV mini-grid in the Nakivale refugee settlement in Western Uganda^2
- Winch Energy commissioned a 128 kWp solar PV mini-grid in partnership with Total Energy to power 500 homes in Bunjako Central Uganda^2
- Equatorial Power deployed a 40kWp mini-grid in partnership with UMEME in Kiwumu, Central Uganda to power 600 households and businesses^3

Despite COVID-19-related delays and regulatory challenges, several mini-grid sites are under construction^2

- WWF is constructing 6 mini-grids in Western Uganda with a total capacity of 170 kW to power 900 households and 205 businesses
- Winch Energy has completed solar PV mini-grids on 6 out of 25 sites in Northern Uganda under GIZ’s Pro Mini-grids project

Medium-long-term pipeline of upcoming projects is promising^2

- Winch Energy plans to start constructing 15 sites in Southern Uganda in 2022. The sites were initially awarded to Welight under GIZ’s Pro Mini-grids project
- An additional 100+ mini-grids are expected to be tendered in 2022
- The draft National Electrification Strategy identifies over 2,700 sites that can be viably powered by mini-grids

Limited access to capital, an uncertain regulatory environment, and the tariff ceiling hinder sector growth^2

- Inadequate access to capital, especially debt, as financiers are skeptical about the financial viability of mini-grids
- Evolving policy on tariffs and changing regulatory environments like the reabsorption of REA into MEMD expected to cause further delays in site approvals and licensing
- $0.30/kWh tariff ceiling is not cost-reflective for most operators, and is therefore difficult to implement without the right subsidies

Notes: *Only includes mini-grids confirmed to be operational

Productive use: Sales were impacted by COVID-19 but market innovations and support from government and ecosystem players have supported operations

Solar appliance sales have drastically fallen since the height of the COVID-19 pandemic, but sales are still dominated by bundled appliances

- Sales still dominated by TVs, solar water, pumps and refrigerators
- Solar appliances are usually bundled with PAYGO solar system sales
- Poor sales performance attributed to inability of households to pay, given impact from the COVID-19 pandemic

Businesses have taken steps to maintain sales despite challenges

- Offered longer payment durations to help customers weather the impact of COVID-19
- Reduced the required deposit amounts on appliances to increase affordability for low-income households
- Despite increasing interest from SHS operators, however, sales traction is still limited

There is increasing sector interest from development partners, investors and government in the PUE

- USAID produced a PUE catalogue focused on Uganda’s agriculture industry profiling the solutions on the market. This includes new products launched in 2020 like the Omnivoltaic fishing lights with PAYGO integration distributed by Tulima solar and InspiraFarms’ cold storage modular pack houses
- GIZ is providing trainings and access to finance for small and medium enterprises, smallholder farmers, and households. It aims to make the mini-grid business model sustainable and ensure that electricity is used to drive economic development
- EEP Africa supported OneLamp’s solar in dairy pilot that aims to distribute affordable cold milk coolers in Western Uganda with funding of up to EUR 350K
- Government, in partnership with FAO, plans to install 40 small-scale solar-powered irrigation systems in Kalungu

Despite increasing sector interest, barriers to growth still exist

- Low affordability due to low household income levels further exacerbated by the COVID-19 pandemic
- Lack of access to finance by PUE providers hinders ability to offer credit to consumers
- Limited awareness of consumers regarding the full offer of PUE appliances on the market limits uptake by the public

Enabling environment: REA has been absorbed into the Ministry of Energy while COVID-19 delayed some of the key draft regulations and strategies

<table>
<thead>
<tr>
<th>Government restructuring</th>
<th>Regulation and policy</th>
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<tbody>
<tr>
<td><strong>REA has been merged into the Ministry of Energy while UEGCL, UETCL and UEDCL are being merged into one company</strong></td>
<td><strong>Isolated mini-grid regulations were passed into law while several other draft policies and strategies were impacted by COVID-19</strong>&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>• REA has temporarily become the Renewable Energy Program (REP), within the Ministry of Energy until Oct 2022 when it will be fully transformed into a Department&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>• Isolated mini-grid regulations: Regulation governing the isolated mini-grid sector was passed into law</td>
</tr>
<tr>
<td>• Uganda Electricity Generation Company Limited (UEGCL), Uganda Electricity Transmission Company Limited (UETCL) and Uganda Energy Distribution Company Limited (UEDCL) are being merged into one company – The Uganda National Electricity Company (UNEC); Merger process is expected to take up to two years and is being spearheaded by the Ministry of Public Service&lt;sup&gt;2&lt;/sup&gt;</td>
<td>• Draft national electrification strategy: Government’s universal energy strategy was delayed by COVID-19; still to be finalized</td>
</tr>
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**Impact**

- While the Ministry of Energy has done a commendable job in engaging various stakeholders to make REA’s transition seamless, there is further opportunity to clarify how REA’s former responsibilities will be shared within the Ministry<sup>2</sup>
- In the short term, this has led to delays in finalizing policies like the energy policy draft, and made processes like shipping authorizations for mini-grid developers longer by up to 7 days
- Expected long-term effects are yet to be determined as more information emerges on the role distribution within the ministry

**Other, expected to strengthen the regulatory environment in the C&I solar sector and productive use, are being drafted**<sup>2</sup>

- **Net metering code**: Regulation governing bi-lateral sale of power between isolated grid operators and national utilities is currently being drafted and is expected to be public in ~18 months
- **PUE strategy**: Strategy to improve the productive use of energy of targeted communities for solar applications; strategy is in the drafting process<sup>2</sup>

**The Electricity connections policy was also suspended**

- **Electricity connections policy**: Provided subsidies for single phase connections; policy was suspended due to exhaustion of World Bank funding for the program; Government has committed to provide funding to resume the policy<sup>4</sup>

Sources:
1. The Independent, Progress of Planned Merger of Government agencies, 2021 [Link]
2. UOMA consultations
3. ERA, Isolated Grid System Regulation 2020 [Link]
4. Daily Monitor, Shs500b needed to connect 200,000 under free electricity policy, 2021 [Link]
**Funding:** Businesses raised USD >52M but funding predominantly reached larger OGS providers; dev’t partners and investors committed an add’l USD 50M+ this year

OGS providers and improved cookstoves (ICS) companies have raised more than USD 52 M over the past year but capital raises remain dominated by large multi-national OGS providers with a few local players raising capital. A few notable deals include:

- **Winch Energy** raised USD 2M in debt from SunFunder, and with NEoT Offgrid Africa invested 12M in Uganda and Sierra Leone.
- **OneLamp** raised a grant of EUR 350K from EEP Africa to support the expansion of milk chilling solutions in Western Uganda.
- **Yellow Solar** raised USD 4M debt to expand, with operations in Uganda and Malawi.
- **Mwezi** raised seed funding of USD 500K to support expansion to Uganda, Ethiopia, and Rwanda.
- **Mandulis Energy** raised grant funding of EUR 100K at the COP26 under the Dutch Fund for Climate and Development.
- **ENGIE Energy Access** Uganda received USD 175K concessional funding from Signify Foundation to support end-user subsidies.
- **FIN-E** raised pre-seed funding of USD 300K.

Local banks are restructuring loans to support businesses despite COVID disruptions; more needs to be done to facilitate access.

- Banks have continued to restructure existing loans and reduced interest rates to increase access.
- However, stringent financing requirements still limit access to most off-grid businesses.

Development partner programs and investors have committed more than USD 50M in the last year

<table>
<thead>
<tr>
<th>Company</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td><strong>BGFA</strong></td>
<td>Launched an ~USD 24.5M results-based financing (RBF) facility managed NEFCO. The Uganda facility (BGFA3) is funded by DANIDA and SIDA and will likely make initial disbursements in 2022.</td>
</tr>
<tr>
<td><strong>Nithio</strong></td>
<td>Raised ~USD 23M from DFC, FSD Africa and EDFI-ElectriFi. Nithio is currently pursuing opportunities in Kenya, Uganda, and Nigeria.</td>
</tr>
<tr>
<td><strong>EU</strong></td>
<td>UGEFA discounted loan facility to support businesses with USD 10K to USD 100K. Businesses will pay back only two thirds of the loans, with UGEFA grant contribution covering the remaining one third.</td>
</tr>
<tr>
<td><strong>GIZ-EnDev</strong></td>
<td>~USD 1.12M COVID-19 Economic Relief Fund, implemented by the Private Sector Foundation Uganda (PSFU), to extend grants to COVID-affected solar and cookstove companies.</td>
</tr>
<tr>
<td><strong>UNCDF</strong></td>
<td>Working capital facility to support OGS providers recover from impact of the pandemic. The facility has supported operators such as All in Trade with concession debt financing of USD 200K.</td>
</tr>
</tbody>
</table>

Note: More details on the capital raises and investors active in the space included in the industry stakeholders section

Industry insights
Healthcare: Off-grid solar has heavily contributed to healthcare center electrification in Uganda, and will continue to be a primary driver in the short- and medium-term

Primary electricity sources for health centers in Uganda

- Solar: 48.3%
- Grid: 46.8%
- Mini-grid: 0.7%
- Generator: 0.2%
- Battery: 0.2%
- Others: 2.9%

Solar energy has the potential to resolve the limited health center electrification in Uganda

- Solar energy powers almost 50% of all electrified health centers in the country
- The technology can provide facilities with a higher quality power source, in particular those with no or very poor access to grid electricity; grid issues currently face issues, including:
  - 6 hours daily grid power outages for health centers
  - 2x daily unscheduled power interruptions

Health clinic electrification has been critical in supporting COVID-19 response, given the need to power diagnostic equipment, ventilators, and cold chain

Business model sustainability has proven to be a key barrier to increased traction in this space

- There is little private sector involvement given challenges such as limited revenue model innovation given regulatory restrictions on business models; dev. partners and NGOs have led most projects
- Several players are still experimenting with various service models with the aim to improve sustainability
- Many health centers don’t have maintenance budgets in place, resulting in inoperative solar PV systems within 3-5 years; further, potential grid arrival threatens to make solar systems redundant

Despite challenges, the private sector in Uganda is engaged and committed to further developing the sector alongside donors

- Uganda has significant experience in solar powered health care electrification with traction largely driven by donor programs
- The World Bank under ERT III electrified 522 health centers, and Signify Foundation under the Lighting Health Stations project electrified 43 health centers
- In tender processes, Ugandan companies consistently feature prominently, demonstrating private sector experience
- There are now more portable and energy-efficient medical devices specifically designed for resource-constrained settings, from organizations such as d.light and Wecare Solar

Sources:
1. MOH, National Health Centre Master List, 2018 [Link]
2. UOMA consultations
3. UN Foundation, Lasting impact – Sustainable off-grid solar delivery models to power health and education, 2019 [Link]
4. UOMA consultations with rural health centers in Uganda
5. World Bank, Increasing Human Capital by Electrifying Health Centers and Schools through Off-Grid Solar Solutions, 2020 [Link]
6. Signify Foundation website [Link]
7. Efficiency for Access, Medical Equipment and Clinic Electrification, 2021 [Link]
Healthcare: Although previous health center electrification efforts have been donor-led, several service models are being implemented to increase sustainability

<table>
<thead>
<tr>
<th>Description</th>
<th>Opportunities</th>
<th>Risks</th>
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<tbody>
<tr>
<td><strong>PAYGO model</strong></td>
<td>Facility pays deposit for the system upfront, then makes regular payments until the cost of the system is covered</td>
<td>The PAYGO model can be implemented with PFP health centers that are often commercially viable and generate an income through charging patients' fees</td>
</tr>
<tr>
<td><strong>Example projects:</strong> Anuel Energy electrified St. Karooli Lwanga hospital using a PAYGO model</td>
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<td></td>
</tr>
<tr>
<td><strong>Hybrid model</strong></td>
<td>Donor pays for part of solar PV system costs while the health center pays for the remaining cost over a fixed period</td>
<td>The hybrid model can benefit PNFP health centers that are often supported by NGOs and religious affiliated organizations. PNFP charge subsidized amounts &amp; may not be able to fully pay for a PV system</td>
</tr>
<tr>
<td><strong>Example projects:</strong> Innovation Africa electrified Mugiti health center with part of the cost covered by Adrienne Everett Foundation</td>
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<tr>
<td><strong>Power Purchase Agreement</strong></td>
<td>Health center agrees to buy power from an operator at pre-agreed terms. The asset is owned by the solar provider</td>
<td>The model can be implemented in the electrification of government health centers in areas with no connection to the grid. Government health centers are free</td>
</tr>
<tr>
<td><strong>Example projects:</strong> Equatorial Power is connecting 5 gov’t health centers to a mini-grid in Namayingo under a PPA</td>
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</tbody>
</table>

- The net-metering code presents an opportunity to leverage health centers as anchor clients and could increase electrification of health centers
- Removing restrictions on government health centers selling excess power to neighboring communities can further catalyze private sector involvement and make projects bankable

Integrated electrification approaches: Stakeholders are piloting and designing new forms of collaboration between both utility providers and off-grid companies

Despite significant strides made towards universal electricity access, a large population could remain unelectrified by 2030

18M people still lack access to electricity (59%)¹

47% 47% of population will receive grid access by 2030²

Integrating all electrification approaches is needed to close the gap

• Grid expansion has proven slow and costly, while business model innovation in off-grid solar and mini-grid have created viable, alternative electrification options

• Least-cost electrification planning should consider grid, mini-grid and off-grid solar technologies, in addition to other market actors like consumer finance providers³

Several initiatives are currently underway to test integrated models

• A coalition of energy sector players led by UMEME, coordinated by Power for All, and funded by the Rockefeller Foundation launched the first integrated energy pilot in Uganda⁶

• The European Union published a report on energy distribution in Uganda with recommendations for Uganda to chart a path to universal energy access through a distributed approach³

• A net metering code that provides a legal framework for bi-lateral sale of electricity between grid operators and mini-grid developers is in the draft phase⁴

Integrated electrification planning requires that sector stakeholders conduct extensive planning and coordination⁵

1 Establish a coordinating body empowered with high-level political buy-in and adequate long-term resources for implementation

2 Solicit expert advice to develop, plan, and build planning capacity needed for implementation

3 Work with experts and stakeholders to obtain relevant data for use in integrated modeling and to identify other planning tools

4 Develop supportive policy measures in consultation with community, civil society, and private sector stakeholders

5 Take steps to mobilize finance and build the electrification ecosystem for both developers and consumers

Utilities 2.0 is a consortium of energy providers supported by Rockefeller Foundation and coordinated by Power for All that aims to test and scale innovative integrated approaches to universal energy access. The consortium is made up of UMEME, the grid distribution utility, Equatorial Power, a mini-grid developer, and EnerGrow, an appliance finance company.

**Case study: The Twaake pilot under Utilities 2.0 has demonstrated early findings that integrated business models can effectively grow energy consumption**

<table>
<thead>
<tr>
<th>Site</th>
<th>Organization</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nyenje Mukono</td>
<td>UMEME</td>
<td>Set up a grid-connected site</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selling and financing productive use assets to both businesses and households</td>
</tr>
<tr>
<td>Kiwumu Mukono</td>
<td>UMEME</td>
<td>Built the distribution network</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deployed &amp; operating 40kWp mini-grid pilot to power 600 households and businesses</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides productive use assets to both businesses and households</td>
</tr>
</tbody>
</table>

**Traction and impact**

- 26% of businesses in the Nyenje site have received income generating assets through asset financing for productive use (PUE); electricity consumption and business have increased by over 50% and 70%, respectively since asset deployment.
- 50% of the businesses in the Kiwumu site are expected to receive asset financing, potentially leading to more jobs and higher business revenues.

**Sector considerations**

- **Subsidy programs** that reduce the initial cost of development for mini-grid developers are still necessary to support commercial viability and scale.
- Private sector players can increase value for consumers by providing **bundled services** e.g., incl. streetlights and water purification.
- A **regulatory environment that fosters innovation** is needed to scale solutions, for example increasing mandates of electricity utilities to sell low voltage appliances or allowing utilities to acquire distributed generation assets.

Sources: 1 Power for All, Twaake Pilot Factsheet, 2021 [Link] 2 UOMA consultations 3 EEG, Business model innovations for utility and mini-grid integration: Insights from the Utilities 2.0 initiative in Uganda[Link]
Demand-side subsidies: Development partners and private sector are testing ways to improve affordability through end user subsidies, but more piloting is required

Volume of financing needed to close energy access gap (off-grid solar) in Uganda by 2030

(USD millions)

<table>
<thead>
<tr>
<th>Affordability gap of USD 329M</th>
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</thead>
<tbody>
<tr>
<td>Grant</td>
</tr>
<tr>
<td>Equity</td>
</tr>
<tr>
<td>Debt</td>
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</table>

 Demand-side subsidies (DSS) can be an essential tool to achieve universal access:

- Unlike other subsidies, DSS close the affordability gap by directly reducing the price paid by end users for OGS products.
- DSS can be provided directly to reduce the price for end users who cannot afford a product, allowing companies to continue selling to those who can pay full price.

A few demand side subsidy programs have been implemented in the OGS sector over the past year:

- The USAID-funded GIZ EnDev last-mile RBF pilot temporarily lowered the cost of off-grid products for participating companies.
- The Engie Energy Access Subsidy program in partnership with Signify Foundation tested the impact of price reduction on access and payment performance.

Sources: 1 SE4All and Catalyst Off Grid Advisors, Taking the Pulse 2019 [Link] 2 ACE, Demand-Side Subsidies in Off-Grid Solar: A tool for achieving universal energy access and sustainable markets, 2020 [Link] 3 PSFU, Last mile RBF for SJS companies [Link] 4 Signify Foundation Partnerships [Link] 5 UOMA consultations
Case study: Engie Energy Access implemented a demand-side subsidy program in partnership with Signify Foundation that has increased affordability by 20%

Case description

Engie Energy Access, a provider of PAYGO home systems, offered a 20% end-user subsidy to consumers of their Fenix Power 2 systems, translating to USD 20 per sale.

The subsidy program was implemented throughout Uganda and was supported with concessional funding from Signify Foundation (up to USD 175K).

Program structure

- The program was run as a nation-wide controlled experiment; the subsidy was applied to 10,000 new customer purchases in 2 treatment groups, with each treatment running for around 2 weeks until the 5,000-customer per group target was met.
- The results were compared to sales under commercial pricing plans in place at the time of the experiment.
- In order to isolate the impact of the price change alone, there was no prior notification internally to Engie teams or to customers, and no change in marketing and sales approaches.
- Surveys were conducted with a representative sample of the treatment and control groups for further demographic insights.
- Results from the program were tracked at 6 months, 12 months and 18 months (12.5%, 25% and 50% of longest loan terms).

Results

Results show subsidies significantly improved affordability (repayment) and reduced instances of default.

- Lower income customers have the most improvement in outcomes.
- Lowering the installment has more impact than reducing loan terms.
- Engie has been able to reach customers with a lower income level having a median income of approximately USD 4.

Sector considerations

OGS providers, development partners, and governments have a role to play in reducing the price to end-users in order to achieve energy access; price reductions are key to making SHS affordable to the ~5M Ugandans who cannot afford to pay USD 0.16 per day, the lowest daily pricing of an entry level solar kit.

Projections show that a 20% reduction on the lowest daily pricing can increase reach to ~1M people, while a 50% reduction can increase reach to ~4M people.

<table>
<thead>
<tr>
<th>Price reduction</th>
<th>% reduction</th>
<th>Population reached</th>
</tr>
</thead>
<tbody>
<tr>
<td>USD 0.13 / day</td>
<td>20%</td>
<td>![1M people icon]</td>
</tr>
<tr>
<td>USD 0.07 / day</td>
<td>50%</td>
<td>![4M people icon]</td>
</tr>
</tbody>
</table>

Sources: 1 UOMA consultations
E-mobility: E-mobility is a growing trend, with solar power expected to make a large contribution through charge station infrastructure

E-mobility has the potential to alleviate air pollution challenges and empower users financially

- Road vehicles, including buses, cars, 2-wheelers and 3-wheelers account for almost 18% of transport CO2 emissions globally\(^1\)
- Kampala’s air quality index (162\(\mu\)g/m3) is 6 times worse than the WHO Air Quality Guidelines, and worse than more industrialized cities such as Beijing (48\(\mu\)g/m3)\(^2\)
- Electric mobility (e-mobility) encompasses transport modes that are battery-powered, eliminating the need for internal combustion engines (ICE), that release toxic particulate matter and CO\(_2\)
- A decline in tailpipe emissions through e-mobility lowers the volume of toxic gases released into the atmosphere and locally\(^1\)
- E-mobility customers report savings since the total cost of operation for electric vehicles is often cheaper than ICE vehicles\(^3\) e.g. a motorcycle driver reports saving over USD 300 in 3 weeks

Solar energy has emerged as a convenient and reliable clean energy option to support charge station expansion\(^4\)

- Solar offers the lowest carbon footprint of available sources
- Solar powered charging stations are easy to install and unhindered by power outages, making them ideal for e-mobility service expansion

Although the sector is nascent, more private sector companies are setting up, and more actors are collaborating to support growth

- Uganda is a pioneer in e-mobility, having built the first solar electric bus in Africa through gov’t owned vehicle manufacturer Kiira EV\(^5\)
- There is increasing private sector involvement with players such as Bodawerk, Zembo and Asobo setting up operations

- There are upcoming business models that offer pricing suitable for low-income individuals e.g battery swapping and PAYGO models\(^1,4\)
- GIZ partnered with Zembo to construct 3 charging stations outside Kampala and Winch Energy is constructing a charging station in Lamwo in partnership with Bodawerk\(^4,6\)

The sector still faces awareness, infrastructure, and data challenges\(^4\)

- Limited reliable market data to support credit scoring, and scaling of operations in Uganda
- Limited infrastructure planning by cities, particularly given low prioritization for e-mobility
- Limited awareness on the benefits of e-vehicles compared to ICE vehicles hinders wide scale adoption and uptake

**Case study:** Zembo is an e-mobility start-up revolutionizing the boda boda market in Uganda through their lease-to-own electric bikes

<table>
<thead>
<tr>
<th>Case description¹</th>
<th>Traction¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zembo (Zero Emission Motorcycle Boda) is a start-up founded in 2018 specializing in innovative and sustainable mobility solutions for Africa. Zembo's electric motorcycle and charging station network have been on the motorcycle taxi &quot;boda boda&quot; market in Uganda since 2019.</td>
<td>Zembo has sold over 200 motorcycles in Uganda and set up 20 charging stations in Kampala and Mukono, and has over 450 batteries in circulation.</td>
</tr>
<tr>
<td></td>
<td>The company received grant financing from a number of key partners such as E4I, PFAN, and EEP Africa.</td>
</tr>
<tr>
<td></td>
<td>It received investment through equity from funders such as Toyota, DOB Equity and InfraCo.</td>
</tr>
<tr>
<td></td>
<td>They plan to sell over 3,000 motorcycles in the next 3 years.</td>
</tr>
</tbody>
</table>

### Overview

- Zembo is creating a new market for e-mobility in Kampala by selling electric motorcycles on a lease-to-own model and building a network of charging stations¹.
- Zembo is leveraging the battery-as-a-service model that decouples investment and usage, enabling more people to make the transition to e-mobility¹.
- The Storm motorcycle, Zembo’s flagship motorcycle, is low-cost to operate and provides 60 km on a single charge at an operating cost of ~UGX 70 per km compared to ~ UGX 90 for ICE motorcycles².
- Parts are sourced from China but motorcycles assembled in Kampala¹,².
- The motorcycles are lowering CO2 particle emissions (1.1 tonnes per 100 km compared to 2.6 tonnes from ICE motorcycles)².

### Sector considerations²

- PAYGO integration that allows for staggered payments over time is important to make e-mobility affordable for low-income households.
- Leveraging partnerships with energy companies such as mini-grid operators can support expansion to regions without grid reach.
- Partnerships with existing mobility companies such as vehicle financing companies can be leveraged for growth.
- Relationships with development partners and government will be important to support sector meet growth and get necessary buy-in for infrastructure development.

Industry stakeholders
**Summary:** Stakeholder landscape consists of 7 categories: private sector, NGOs, financiers, development partners, government, associations & other stakeholders.

- **Development partners** consist of international independent agencies backed by governement to fund and support initiatives in both public & private sectors.
- **Government** consists of bodies that have the mandate for regulation distribution & generation of energy.
- **Associations** are organizations that represent private sector players like operators & advocate for favorable policies and conditions to accelerate energy.
- **Other stakeholders** consist of global & regional organizations that support private sector with data, market linkages, etc.
- **Financiers** consist of DFIs, PE funds, and investors that develop financing facilities to meet capital needs of energy players.
- **NGOs** consist of international and local NGOs that are supporting electrification of schools and health centers.
- **Private sector operators** comprise of Solar Home System, Mini-grid & Productive Use providers in the market.
## Business models, product offering, regional distribution and sales to date by SHS and PUE operators in Uganda (1/15)

<table>
<thead>
<tr>
<th>Business</th>
<th>Summary</th>
<th>Product offering</th>
<th>Milestones and updates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engie</td>
<td>Engie is distributor, installer, consumer financier and after sales service provider of solar home and lighting and mini-grids systems</td>
<td>Residential products such lanterns &amp; PAYGO SHS, commercial products including large integrated systems and mini-grids</td>
<td>Merged Fenix Int’l, Mobisol, and Power Corner into one organization: <strong>Engie Energy Access</strong></td>
</tr>
<tr>
<td>SolarNow</td>
<td>SolarNow is a manufacture, distributor, installer, consumer financier and after sales service provider of solar products like SHS, panels, lights, etc., since 2011</td>
<td>Residential &amp; commercial products, served small businesses and institutions like hospitals &amp; schools</td>
<td>Large focus on PUE appliances such as pumps</td>
</tr>
<tr>
<td>Kambasco Technologies</td>
<td>Kambasco Technologies is a distributor and consumer financiers of solar powered products and systems such as home lighting systems and water pumps since 2015</td>
<td>Residential and commercial products</td>
<td>Focused on coordinating and accelerating efforts to expand access to energy to rural and off grid health facilities</td>
</tr>
<tr>
<td>BrightLife Uganda</td>
<td>BrightLife Uganda is a social enterprise that distributes, installs, finances and offers after sale services on solar lanterns, solar home lighting systems since 2015</td>
<td>Residential product; mainly serves BoP consumers</td>
<td>Adapted operation due impact of COVID-19 restrictions</td>
</tr>
<tr>
<td>M-KOPA</td>
<td>M-KOPA is a manufacturer, distributor, installer, consumer financier and after sales service provider of solar products like SHS and fridges, since 2012</td>
<td>Residential and commercial products, serves small businesses</td>
<td>Developed and is currently selling a solar-powered PAYGO fridge for BoP consumers</td>
</tr>
</tbody>
</table>

Source: Company websites and press releases
# Business models, product offering, regional distribution and sales to date by SHS and PUE operators in Uganda (2/15)

<table>
<thead>
<tr>
<th>Business</th>
<th>Summary</th>
<th>Product offering</th>
<th>Milestones and updates</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SOLANTIS</strong></td>
<td>Solantis solar is a manufacturer, distributor, installer, and consumer financier of solar products like SHS and lanterns, since 2016</td>
<td>Residential products including solar home systems, lanterns and accessories such as radios &amp; TVs</td>
<td>Filled for bankruptcy in 2020 &amp; acquired by Village Power</td>
</tr>
<tr>
<td><strong>D&amp;S DAVIS &amp; SHIRTLIFF</strong></td>
<td>Davis &amp; Shirtliff is distributor, installer and after sales services provider of water solutions and solar products since 1996; the company offers solar products such as batteries, SHS and refrigerators</td>
<td>Residential, commercial and institutional products</td>
<td>Undertook the solarization of existing boreholes in Bidi bidi refugee camp in Northern Uganda</td>
</tr>
<tr>
<td><strong>GLP</strong></td>
<td>GLP is a social business that designs, distributes and finances solar powered products such as lamps and solar home systems since 2009. GLP also offers consumer after sales services to its customers</td>
<td>Residential and commercial products</td>
<td>Raised USD 90M in financing to support expansion of PAYGO business and expansion into new countries</td>
</tr>
<tr>
<td><strong>Solar Today</strong></td>
<td>Solar Today is a distributor and installer of solar products like SHS and water heaters, since 2010</td>
<td>Residential and institutional products, serves hospitals</td>
<td>Partnered with Innovex—a Uganda-based startup enabling PAYGP and remote monitoring for OGS companies</td>
</tr>
<tr>
<td><strong>Adritex</strong></td>
<td>Adritex is a water solutions company that distributes, installs and provides after sales services for water equipment and solar such products as water pumps and water heaters since 2014</td>
<td>Residential, commercial &amp; institutional products; partners with the gov't to develop large-scale irrigation projects</td>
<td>Contracted by FAO to install solar sprinkler irrigation systems in Nebbi and Zombo districts in Northern Uganda</td>
</tr>
</tbody>
</table>
### Business models, product offering, regional distribution and sales to date by SHS and PUE operators in Uganda (3/15)

<table>
<thead>
<tr>
<th>Business</th>
<th>Summary</th>
<th>Product offering</th>
<th>Milestones and updates</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anuel Energy</strong></td>
<td>Anuel Energy is a distributor and installer of plug and play solar home systems since 2015. The company also offers consumer financing and after sales services to their customers</td>
<td>Includes products domestic households but also provides for commercial and institutional products</td>
<td>Pivoted business models from PAYGO to PUE &amp; institutional consumers such as schools &amp; health centers</td>
</tr>
<tr>
<td><strong>Davis &amp; Shirtliff</strong></td>
<td>Davis &amp; Shirtliff is distributor, installer and after sales services provider of water solutions and solar products since 1996; the company offers solar products such as batteries, SHS and refrigerators</td>
<td>Residential, commercial and institutional products</td>
<td>Distributor and in-country partner for Agsol solar powered mills</td>
</tr>
<tr>
<td><strong>Village Energy</strong></td>
<td>Village Energy is a distributor, installer, consumer financier and after sales service provider of solar products like SHS, water pumps, water heaters and lights, since 2009</td>
<td>Products serve refugee camps, institutions like schools and commercial clients like SMEs</td>
<td>Supported the electrification of health centers in partnership with SENDEA &amp; Signify Foundation</td>
</tr>
<tr>
<td><strong>AB Matra Uganda Ltd</strong></td>
<td>AB Matra is distributor and installer of solar powered products such as inverters, panels, home systems, lanterns and water heaters</td>
<td>Residential, commercial and institutional products, serve schools</td>
<td>Not available</td>
</tr>
<tr>
<td><strong>ADH Group</strong></td>
<td>ADH Group is a distributor of solar powered products such as refrigerators, panels, and batteries at both retail and wholesale since 2013</td>
<td>Residential and commercial products</td>
<td>Not available</td>
</tr>
</tbody>
</table>
## Business models, product offering, regional distribution and sales to date by SHS and PUE operators in Uganda (4/15)

<table>
<thead>
<tr>
<th>Business</th>
<th>Summary</th>
<th>Product offering</th>
<th>Milestones and updates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assen Ventures</td>
<td>Assen Ventures is a distributor, installer and after sales services provider on both electrical and solar powered products such as water pumps, water heaters and irrigation systems since 2008</td>
<td>Residential, commercial products, products can also serve and institutional clients</td>
<td>Executed solar water pumping projects in Palabek refugee settlements, Bidi refugee camp and Rhino refugee settlement</td>
</tr>
<tr>
<td>Battery Plus Ltd</td>
<td>Battery Plus Ltd is a distributor and installer automotive batteries and solar products such as batteries, inverters and water heating systems since 1996</td>
<td>Residential and institutional products</td>
<td>Not available</td>
</tr>
<tr>
<td>D.Light</td>
<td>D.Light is a distributor, installer, consumer financier and aftersales services provider of solar lighting systems and solar appliances like fans and TVs since 2017</td>
<td>Residential and commercial products, serves small businesses</td>
<td>Launched rapid response rural healthcare solution, including solar arrays, smart phone and fridge for storing medicines</td>
</tr>
<tr>
<td>Kirchner Solar</td>
<td>Kirchner Solar is a distributor an installer of solar powered products like SHS, water heaters, TVs, etc. since 1996</td>
<td>Residential and commercial products, serves small businesses</td>
<td>Received EUR 400K subsidy to construct 22.5 kW mini-grid in central Uganda with Airtel as an anchor customer</td>
</tr>
<tr>
<td>Solar Energy for Africa</td>
<td>Solar Energy for Africa is a distributor, installer and after sales service provider of solar products like SHS, streetlights, batteries, etc., since 1995</td>
<td>Residential, commercial and institutional products, serves hospitals</td>
<td>Not available</td>
</tr>
</tbody>
</table>

Source: Company websites and press releases
<table>
<thead>
<tr>
<th>Business</th>
<th>Summary</th>
<th>Product offering</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Water &amp; Pumps International</td>
<td>Water &amp; Pumps international is a distributor and installer of solar products like water pumps, water heaters and street lights, since 2013</td>
<td>Residential products</td>
<td>Not available</td>
</tr>
<tr>
<td>Advanced Solar Power Ltd</td>
<td>Advanced Solar Power Ltd is a distributor, installer and after sales provider of solar products such as streetlights, solar water pumps and solar water heaters since 2015</td>
<td>Residential and commercial products</td>
<td>Not available</td>
</tr>
<tr>
<td>African Energy Depot Ltd</td>
<td>African Energy Depot Ltd is a distributor of solar, mini-grid and power backup products since 2015; the company distributes solar products such as batteries, water pumps and lighting products</td>
<td>Commercial and institutional products for the government and medical centers, etc.</td>
<td>Expanded product portfolio to include higher capacity battery storage &amp; high-performance remote monitoring equipment</td>
</tr>
<tr>
<td>All in Trade</td>
<td>All in Trade is a distributor of quality solar products like inverters, water heaters and pumps and has installed ~25MW solar power to date since inception in 2008</td>
<td>Institutional, commercial products for corporate use</td>
<td>Supported the electrification of 46 health centers with support of various partners such as UNHCR &amp; Care International</td>
</tr>
<tr>
<td>All Africa Ultimate Solar Energy</td>
<td>All Africa Ultimate Solar Energy is a distributor, installer and after sales services provider of solar products such as home systems, street lights, batteries and CCTV cameras</td>
<td>Residential, commercial products for hotels, gas stations, cold warehouses, etc. and institutional products for the gov’t and hospitals</td>
<td>Not available</td>
</tr>
</tbody>
</table>
### Business models, product offering, regional distribution and sales to date by SHS and PUE operators in Uganda (6/15)

<table>
<thead>
<tr>
<th>Business</th>
<th>Summary</th>
<th>Product offering</th>
<th>Milestones and updates</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline Africa Ltd</strong></td>
<td>Baseline Africa Ltd is a distributor of solar home systems and components such as batteries and inverters since 2002</td>
<td>Data not available</td>
<td>Not available</td>
</tr>
<tr>
<td><strong>Bitcom Delta EA Ltd</strong></td>
<td>Bitcom Delta EA Ltd is a provider of both ICT and power solutions since 2017; the company distributes and installs solar products such as batteries, inverters, panels and water heaters</td>
<td>Residential, commercial and institutional products</td>
<td>Installed C&amp;I 172 kW solar project at NUCAFE factory in partnership with Village Energy</td>
</tr>
<tr>
<td><strong>Chloride Exide</strong></td>
<td>Chloride Exide is a distributor and installer of automotive batteries and solar equipment such as panels, heating systems and batteries since 2001</td>
<td>Residential and commercial products that also serve small businesses</td>
<td>Not available</td>
</tr>
<tr>
<td><strong>Crown Energy Systems</strong></td>
<td>Crown Energy Systems is a distributor, installer and aftersales service provider of solar products such as panels and water pumps since 2010</td>
<td>Residential and commercial products</td>
<td>Not available</td>
</tr>
<tr>
<td><strong>Access to Solar Technologies</strong></td>
<td>Access to Solar Technologies is a social enterprise that distributes, installs and offers after sales services for solar products such as water pumps, water heaters, TVs, refrigerators, etc since 2016</td>
<td>Residential products</td>
<td>Implements a “Solar Village Project” model that prioritizes concentrated power supply to the entire village</td>
</tr>
</tbody>
</table>
## Business models, product offering, regional distribution and sales to date by SHS and PUE operators in Uganda (7/15)

<table>
<thead>
<tr>
<th>Business</th>
<th>Summary</th>
<th>Product offering</th>
<th>Milestones and updates</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ASE Solar Ltd</strong></td>
<td>Ase Solar Ltd is a manufacturer and distributor of solar products such as panels, lighting products and energy backup systems like batteries and regulators since 2004</td>
<td>Residential products</td>
<td>Not available</td>
</tr>
<tr>
<td><strong>Azuri Technologies</strong></td>
<td>Azuri Technologies is a full-service provider of solar home systems and solar water pumps, offering all services across the value chain from manufacturing to after sales services since 2012</td>
<td>Residential and commercial products for small businesses like shops</td>
<td>Growfast, Azuri’s solar irrigation solution, was named winner of Uganda renewable energy fund by the UN CleanStart program</td>
</tr>
<tr>
<td><strong>Barefoot Uganda</strong></td>
<td>Barefoot Uganda is a social enterprise that distributes solar lighting products and solar phone charging systems since 2008</td>
<td>Residential and commercial products; mainly serve BoP consumers</td>
<td>One of the implementers of the Inclusive Dairy Enterprise project funded by the Netherland Embassy</td>
</tr>
<tr>
<td><strong>Basal Solutions</strong></td>
<td>Basal Solutions is a distributor, installer and after sales services provider for solar products such as water pumps, water heaters, SHS and batteries</td>
<td>Residential, commercial and institutional products that can serve telecommunications companies</td>
<td>Supported the electrification of 46 health centers with support of various partners such as UNHCR &amp; Care International</td>
</tr>
<tr>
<td><strong>Aptech Energy</strong></td>
<td>Aptech Energy is a solar and water pump specialist since 2012; the company distributes, installs and offers after sales services on solar products such as water pumps, heaters, streetlights and batteries</td>
<td>Residential and commercial products</td>
<td>Received 250K debt funding from UNCDF for inventory financing (2018), and in 2021 was awarded funding from the Jack Ma Foundation</td>
</tr>
</tbody>
</table>
## Business models, product offering, regional distribution and sales to date by SHS and PUE operators in Uganda (8/15)

<table>
<thead>
<tr>
<th>Business</th>
<th>Summary</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ARED SMC</td>
<td>ARED SMC is a service company that designs and distributes smart solar powered kiosks that offer phone charging, wifi connectivity and airtime purchase since 2013</td>
<td>Commercial products, targeting mainly women and low-income earners</td>
<td>Not available</td>
</tr>
<tr>
<td>Ekorn Solar Ltd</td>
<td>Ekorn Solar Ltd is a distributor and installer of energy saving and solar products such as batteries, SHS, water heaters, pumps, streetlights and refrigerators since 2011</td>
<td>Residential &amp; commercial products for small businesses &amp; farmers; serves institutions like prisons, hospitals &amp; schools</td>
<td>Not available</td>
</tr>
<tr>
<td>Energy Systems Limited</td>
<td>Energy Systems Limited is a distributor, installer and after sales service provider of solar energy products such as refrigerators, water pumps and power hybrid systems since 2002</td>
<td>Residential, commercial, institutional products</td>
<td>Not available</td>
</tr>
<tr>
<td>Epicenter Africa</td>
<td>Epicenter Africa is a distributor, installer and after sales services provider of solar products such as home lighting systems, street lightings, solar water pumps and energy back up systems since 2009</td>
<td>Residential, and commercial products that serve industries</td>
<td>Implemented solar water pumping project in Kakuma refugee camp with funding from UNHCR</td>
</tr>
<tr>
<td>E- Power Solutions</td>
<td>E- Power Solutions is a distributor and installer of air conditioning and solar power products such as panels, streetlights, water pumps and batteries since 2004</td>
<td>Residential products</td>
<td>Not available</td>
</tr>
</tbody>
</table>
## Business models, product offering, regional distribution and sales to date by SHS and PUE operators in Uganda (9/15)

<table>
<thead>
<tr>
<th>Business</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Fresca Investments</td>
<td>Fresca Investments is a distributor, installer and after sales provider of both electrical and solar equipment; the company offers solar products such as panels and water heating systems since 2012</td>
<td>Residential, commercial and institutional products</td>
<td>Not available</td>
</tr>
<tr>
<td>Global Solar Systems Limited</td>
<td>Global Solar Systems Limited is a distributor of solar powered equipment such as water heaters and water pumps since 2005</td>
<td>Data not available</td>
<td>Not available</td>
</tr>
<tr>
<td>Great Seas (U) Ltd</td>
<td>Great Seas (U) Ltd is a distributor of solar powered products such as water heaters, fans, refrigerators, lanterns</td>
<td>Residential and commercial products</td>
<td>Not available</td>
</tr>
<tr>
<td>Green Power International</td>
<td>Green Power International is a manufacturer, distributor and installer of solar powered products such as water pumps, streetlights, panels and SHS since 2017</td>
<td>Residential and commercial products</td>
<td>Key projects include solar power system for NURI in Adjumani &amp; 10 kW system for Kitalya prison</td>
</tr>
<tr>
<td>HTGETS</td>
<td>HTGETS is a distributor, installer and after sales provider of solar products such as energy back up systems, refrigerators, water heaters and home &amp; street lighting systems since 2015</td>
<td>Residential and institutional products for hospitals; also partner with NGOs on community electrification projects</td>
<td>Not available</td>
</tr>
</tbody>
</table>
## Business models, product offering, regional distribution and sales to date by SHS and PUE operators in Uganda (10/15)

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Solar Pipo</td>
<td>Solar Pipo is a system designer, installer and financier of solar cooling systems and water pumps mainly in the dairy sector</td>
<td>Commercial products; targeting dairy and agricultural projects</td>
<td>Installed 15 projects in the dairy sector with a total energy demand of 225 kW &amp; has 3 projects in the pipeline</td>
</tr>
<tr>
<td>Kenni Invest Uganda</td>
<td>Kenni Invest Uganda is a distributor, installer and consumer financier of solar home systems since 2012</td>
<td>Residential products</td>
<td>Not available</td>
</tr>
<tr>
<td>LEEM Electronics</td>
<td>LEEM Electronics is a distributor and installer of SHS since 2014</td>
<td>Residential products</td>
<td>Not available</td>
</tr>
<tr>
<td>Mr. Solar Limited</td>
<td>Mr. Solar Limited is a distributor and installer of solar products like solar panels since 2018</td>
<td>Residential products</td>
<td>Not available</td>
</tr>
<tr>
<td>Innovation Africa Ltd</td>
<td>Innovation Africa is a distributor &amp; installer of solar powered products like motors and water pumps since 2005</td>
<td>Institutional products for schools and hospitals; supplies products for residential projects like water access in villages</td>
<td>Not available</td>
</tr>
</tbody>
</table>

Source: Company websites and press releases
## Business models, product offering, regional distribution and sales to date by SHS and PUE operators in Uganda (11/15)

<table>
<thead>
<tr>
<th>Business</th>
<th>Summary</th>
<th>Product offering</th>
<th>Milestones and updates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature Solar</td>
<td>Nature Solar is a distributor of solar products like solar panels, since 2018</td>
<td>Residential and commercial products; sells to other solar distributors</td>
<td>Not available</td>
</tr>
<tr>
<td>New Age Solar Technologies</td>
<td>New Age solar Technologies is a distributor, installer and after sales service provider of solar products like street bulbs, batteries, inverters, refrigerators and TVs since 2010</td>
<td>Residential and commercial products for small businesses</td>
<td>Not available</td>
</tr>
<tr>
<td>New Sun Ltd</td>
<td>New Sun Limited is a distributor, installer and after sale service provider of solar products like solar panels, inverters, batteries, etc., since 2005</td>
<td>Residential &amp; commercial products; also serves government &amp; large organizations</td>
<td>Licensed importer of African Energy and Suntech solar panels</td>
</tr>
<tr>
<td>New Sun Solar</td>
<td>New Sun Solar is an installer of solar water pumps, since 2012</td>
<td>Institutional products for government organizations</td>
<td>Not available</td>
</tr>
<tr>
<td>Powercon Solar Energy Company</td>
<td>Powercon Solar Energy Company is an installer of solar products like SHS, since 2010</td>
<td>Residential and commercial products for small businesses</td>
<td>Not available</td>
</tr>
</tbody>
</table>
## Business models, product offering, regional distribution and sales to date by SHS and PUE operators in Uganda (12/15)

<table>
<thead>
<tr>
<th>Business</th>
<th>Summary</th>
<th>Product offering</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Seven Hills Impex Limited</td>
<td>Seven Hills Impex Limited is a distributor of solar products like solar panels and batteries, since 2001</td>
<td>Residential products</td>
<td>Not available</td>
</tr>
<tr>
<td>Solar Point</td>
<td>Solar Point is a distributor of solar products like solar panels and lamps, since 2014</td>
<td>Residential products</td>
<td>Not available</td>
</tr>
<tr>
<td>SoloGrid</td>
<td>SoloGrid is a manufacturer, distributor, installer and consumer financier of SHS, since 2012</td>
<td>Residential and commercial products; also serves institutions like schools</td>
<td>Signed technology partnership with Angaza and has develop products targeted at the medical &amp; school markets</td>
</tr>
<tr>
<td>Solvic Solutions Limited</td>
<td>Solvic Solutions Limited is an installer of solar products like solar panels and charge controllers, since 2015</td>
<td>Institutional products for telecommunication companies</td>
<td>Not available</td>
</tr>
<tr>
<td>Sunami solar</td>
<td>Sunami solar is a distributor, installer, consume financier and after sales service provider of solar products like SHS, water pumps, TVs and fridges, since 2016</td>
<td>Residential and commercial products for small businesses</td>
<td>Not available</td>
</tr>
</tbody>
</table>
## Business models, product offering, regional distribution and sales to date by SHS and PUE operators in Uganda (13/15)

<table>
<thead>
<tr>
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<th>Summary</th>
<th>Product offering</th>
<th>Milestones and updates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunny Money</td>
<td>Sunny Money is a distributor of solar lanterns, since 2008</td>
<td>Residential products</td>
<td>Not available</td>
</tr>
<tr>
<td>SunTap Uganda Limited</td>
<td>SunTap Uganda Limited is a solar distributor and installer of solar products like SHS and streetlights, since 2015</td>
<td>Residential and institutional products; also serves international alert sites</td>
<td>Supported the electrification of health centers e.g. Mpuge HC in Mukono</td>
</tr>
<tr>
<td>Trans African Supply Services</td>
<td>Trans African Supply Services is a solar distributor and installer of SHS, water pumps and streetlight, since 2002</td>
<td>Residential and institutional products for government &amp; organizations</td>
<td>Constructed solar piped water schemes in rural areas in Uganda in partnership Ministry of Water</td>
</tr>
<tr>
<td>Ugasolar Suppliers Limited</td>
<td>Ugasolar Suppliers Limited is a solar distributor and installer of SHS</td>
<td>Residential products</td>
<td>Not available</td>
</tr>
<tr>
<td>Ultratec Uganda Limited</td>
<td>Ultratec Uganda Limited is a distributor and installer of solar products like lamps, panels, water pumps and water heaters since 1999</td>
<td>Residential and institutional products for government organizations</td>
<td>Not available</td>
</tr>
</tbody>
</table>
## Business models, product offering, regional distribution and sales to date by SHS and PUE operators in Uganda (14/15)

<table>
<thead>
<tr>
<th>Business</th>
<th>Summary</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Village Power</td>
<td>Village Power is a distributor, installer, consumer financier an after-sales service provider of SHS, since 2014</td>
<td>Residential products</td>
<td>Partnered with Mercy Corps to provide 54 households and 6 businesses in Bid bidi refugee camp with solar solutions</td>
</tr>
<tr>
<td>W.Water Works</td>
<td>W.Water Works is a distributor and installer of solar water pumps since 2015</td>
<td>Institutional and commercial products for farms and small businesses</td>
<td>Supported the electrification of health centers e.g. Mpuge HC in Mukono</td>
</tr>
<tr>
<td>One Lamp</td>
<td>One Lamp is a distributor of solar lamps and solar milk chillers since 2014</td>
<td>Residential products</td>
<td>Received EUR 350K grant funding from EEP Africa to a solar-powered refrigeration and milk storage solutions for dairy farmers in Western Uganda</td>
</tr>
<tr>
<td>Ital Trade Limited</td>
<td>Ital Trade Limited is a solar distributor, installer and after sale service provider of solar powered products like inverters, solar panels and batteries since 1996</td>
<td>Residential and commercial products</td>
<td>Not available</td>
</tr>
<tr>
<td>Luk Solar Uganda</td>
<td>Luk Solar Uganda is a distributor and after sales service provider of solar lamps since 2013</td>
<td>Residential clients and institutional products for government organizations</td>
<td>Not available</td>
</tr>
</tbody>
</table>

**Industry stakeholders**

- **Private sector operators**
  - NGO
  - Financiers
  - Government
  - Dev partners
  - Associations
  - Other stakeholders
## Business models, product offering, regional distribution and sales to date by SHS and PUE operators in Uganda (15/15)

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>gnuGrid Africa</td>
<td>gnuGrid Africa is a Uganda based fin-tech and clean-tech social enterprise that is enabling financial and energy inclusion through data</td>
<td>Credit reference bureau for informal financial institutions, CRM for solar companies and smart batteries for off-grid communities</td>
<td>Raised USD 612K seed round to pivot into fintech</td>
</tr>
<tr>
<td>Mwezi</td>
<td>Mwezi is a last mile solar energy distributor that aims to improve the lives of households in rural communities</td>
<td>Residential and commercial products</td>
<td>Raised USD 500K investment from the BUILD Fund created in partnership with Bamboo Capital partners &amp; UNCDF</td>
</tr>
<tr>
<td>Yellow Solar</td>
<td>Yellow Solar is a last mile distributor of PAYGO solar home systems to low-income rural households</td>
<td>Residential products</td>
<td>Received debt financing of USD 4 million for expansion in Malawi and Uganda</td>
</tr>
<tr>
<td>Fin-e Innovations Limited</td>
<td>Fin-e Innovations Limited is a Ugandan based clean energy fintech that aims to decentralize and scale funding for Uganda energy SMEs</td>
<td>Commercial and industrial products</td>
<td>Closed pre-seed funding of USD 300K</td>
</tr>
<tr>
<td>Balton Uganda</td>
<td>Balton Uganda is the Uganda subsidiary of Balton CP that offers environmentally friendly green solutions in areas of power and solar water heating systems</td>
<td>Commercial and industrial products such as solar water heater, solar irrigators &amp; solar pumps</td>
<td>Balton has a distribution partnership with Chromagen, a leading international manufacturer of solar and electric water heaters</td>
</tr>
</tbody>
</table>

Source: Company websites and press releases
## Business

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<tr>
<td>Kiira Motors</td>
<td>Kiira Motors is a vehicle manufacturer, launched in 2007 as a research project in Makerere University, Uganda. It was incorporated in 2011, and is owned jointly by the Government of Uganda (96%) and Makerere University (4%)</td>
<td>Several vehicles including solar powered buses and private cars</td>
<td>Currently in the final stages of construction of a factory in Jinja district, Eastern Uganda, with a projected capacity of 22 vehicles per day</td>
</tr>
<tr>
<td>Bodawerk</td>
<td>Bodawerk is a Ugandan social enterprise founded in 2017 that is developing mobility solutions in the field of lithium-ion batteries. Bodawerk retrofits existing bodas' petrol-driven power engines with electric ones</td>
<td>Electric motorbikes and electric tractors</td>
<td>Developed zero emission electric boda bodas and agricultural equipment with funding from FCDO and other development partners</td>
</tr>
<tr>
<td>ASOBO</td>
<td>ASOBO is a start-up developing sustainable platforms for e-mobility services on the water in emerging markets. ASOBO e-Boarders are electric outboard engines for small fishing boats powered by renewable energy</td>
<td>Fishing boat engines</td>
<td>Closed grant funding of EUR 500K from EEP Africa to pilot a PAYGO model in Uganda, Tanzania and Kenya</td>
</tr>
<tr>
<td>Zembo</td>
<td>Zembo (Zero Emission Motorcycle Boda) is a start-up founded in 2018 specializing in innovative and sustainable mobility solutions for Africa</td>
<td>Electric motorbikes</td>
<td>Raised USD 3.4M from several international funders including Toyota and InfraCo to expand operations in Uganda</td>
</tr>
</tbody>
</table>

Source: Company websites and press releases
A number of mini-grids have been constructed in Uganda due to support from the private sector, UG government, dev’t partners & other financiers (1/4)

<table>
<thead>
<tr>
<th>Region</th>
<th>Existing mini-grids</th>
<th>Years in operation</th>
<th>Technology &amp; capacity</th>
<th>Developer &amp; partners</th>
<th>Funds raised and financiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tiribogo gasification</td>
<td>8</td>
<td>32kW Biomass</td>
<td>Developer: Pamoja</td>
<td>Grant from Royal</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>gasification</td>
<td>Energy Ltd</td>
<td>Institute of Technology</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>170 connections</td>
<td>Partner: Former REA</td>
<td>Stockholm &amp; Renewable</td>
<td></td>
</tr>
<tr>
<td>Magara gasification</td>
<td>7</td>
<td>32kW Biomass</td>
<td>Developer: Pamoja</td>
<td>Grant from Royal</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>gasification</td>
<td>Energy Ltd</td>
<td>Institute of Technology</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>72 connections</td>
<td>Partner: REA</td>
<td>Stockholm &amp; Renewable</td>
<td></td>
</tr>
<tr>
<td>Bukuzindu solar-diesel plant</td>
<td>7</td>
<td>Hybrid gen. station</td>
<td>Developer: Kalangala</td>
<td>$50M from a mixture of debt, grants and corporation, Industrial Development</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>600 kW (Solar) &amp;</td>
<td>Infrastructure Services</td>
<td>Equity from Uganda</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.6MW (Diesel)</td>
<td></td>
<td>Development Cooperation, Industrial Development</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>40 villages (~2500 hhs)</td>
<td></td>
<td>Corporation of South Africa, Nedbank,</td>
<td></td>
</tr>
<tr>
<td>Kiboga solar mini-grid</td>
<td>10</td>
<td>1kW Solar PV</td>
<td>Developer: Centre for</td>
<td>Grant from National Council for</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 connections</td>
<td>Research in Energy and</td>
<td>Science and Technology (NCST)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Energy Conservation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kitobo Solar Plant</td>
<td>5</td>
<td>230kW Solar PV</td>
<td>Developer: Absolute</td>
<td>$730K grant financing from</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>541 connections</td>
<td>Energy Africa Ltd</td>
<td>Energy and Environment</td>
<td></td>
</tr>
</tbody>
</table>

Industry stakeholders

Private sector operators

NGOs

Financiers

Government

Dev partners

Associations

Other stakeholders

A number of mini-grids have been constructed in Uganda due to support from the private sector, UG government, dev't partners & other financiers (2/4)

<table>
<thead>
<tr>
<th>Region</th>
<th>Existing mini-grids</th>
<th>Years in operation</th>
<th>Technology &amp; capacity</th>
<th>Developer &amp; partners</th>
<th>Funds raised and financiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central</td>
<td>Kichner solar minigrid</td>
<td>12</td>
<td>22kW Solar PV 60 connections</td>
<td>Developer: Kirchner Solar Ltd Partners: Former REA</td>
<td>$246K grant subsidy from GiZ¹</td>
</tr>
<tr>
<td></td>
<td>Bunjanko Island mini-grids</td>
<td>&lt;1</td>
<td>128 kW Solar PV 500 connections</td>
<td>Developer: Winch Energy Partner: Total Energies</td>
<td>Equity funding of USD 1M from both Winch Energy and Total Energies²³</td>
</tr>
<tr>
<td></td>
<td>Kiwumu solar mini-grid</td>
<td>&lt;1</td>
<td>40 kW solar PV 300 households and 60 businesses</td>
<td>Developer: Equatorial Power Partners: UMEME, Power for All</td>
<td>Grant funding from the Rockefeller Foundation⁴</td>
</tr>
<tr>
<td></td>
<td>Bwindi community microgrid</td>
<td>7</td>
<td>64kW Hydro 42 connections</td>
<td>Developer: Bwindi Community Hospital Partners: GiZ &amp; EnDev</td>
<td>$1.23M - $123M grant from GiZ and EnDev⁵</td>
</tr>
</tbody>
</table>

A number of mini-grids have been constructed in Uganda due to support from the private sector, UG government, dev’t partners & other financiers (3/4)

<table>
<thead>
<tr>
<th>Region</th>
<th>Existing mini grids</th>
<th>Years in operation</th>
<th>Technology &amp; capacity</th>
<th>Developer &amp; partners</th>
<th>Funds raised and financiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kisiizi Hydropower</td>
<td>37</td>
<td>300kW hydro &amp; 60 kW hydroelectric &amp; diesel generator of 80kva 710 connections</td>
<td>Developer: Kisiizi Power  Partners: Kisiizi Hospital, Church of Uganda</td>
<td>$900K; 30% equity from Kisiizi Hospital and 70% grant from the World Bank¹</td>
<td></td>
</tr>
<tr>
<td>Kyamagaruru solar plant</td>
<td>6</td>
<td>13kW Solar PV 68 connections</td>
<td>Developer: Energy for Development  Partners: Former REA</td>
<td>Grant from University of Southampton</td>
<td></td>
</tr>
<tr>
<td>Kanyegaramire solar plant</td>
<td>6</td>
<td>13kW Solar PV 74 connections</td>
<td>Developer: Energy for Development  Partners: REA</td>
<td>Grant from University of Southampton</td>
<td></td>
</tr>
<tr>
<td>Eco-Garden micro-hydropower plant</td>
<td>7</td>
<td>5kW Hydro 16 connections</td>
<td>Developers: Eco-Gardens Rwenzori  Partners: Renewable Energy Business Incubator (REBI)</td>
<td>Equity from Eco-Garden Rwenzori</td>
<td></td>
</tr>
<tr>
<td>Kabalega Hydropower plant</td>
<td>9</td>
<td>9MW Hydro 203 connections</td>
<td>Developers: Hydromax Limited  Partners: Former REA</td>
<td>Equity from Hydromax; additional $53.7M grant from the Norwegian government and $23.7M debt from the French Development Agency¹</td>
<td></td>
</tr>
</tbody>
</table>

Sources: UOMA research and analysis 1. InfraCO Africa, President opens Uganda’s first solar thermal power plant, 2015 [link]
A number of mini-grids have been constructed in Uganda due to support from the private sector, UG government, dev’t partners & other financiers (4/4)

<table>
<thead>
<tr>
<th>Region</th>
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</thead>
<tbody>
<tr>
<td>West</td>
<td>RMS Pico Hydropower</td>
<td>8</td>
<td>5kW Hydro 3 connections</td>
<td><strong>Developer:</strong> Rwenzori Mountaineering Services (RMS)</td>
<td>Grant from Private Sector Foundation Uganda (PSFU)</td>
</tr>
<tr>
<td></td>
<td>Pamoja gasification – Kamwenge District</td>
<td>3</td>
<td>75kW Biomass gasification 500 connections</td>
<td><strong>Developer:</strong> Pamoja Energy Limited</td>
<td>$369K grant from Energy and Environment Partnership (EEP) Programme</td>
</tr>
<tr>
<td></td>
<td>Nakivale Refugee camp Solar mini-grid</td>
<td>&lt;1</td>
<td>10.8 kW Solar PV 4 connections</td>
<td><strong>Developer:</strong> UNHCR Partner: Office of the Prime Minister</td>
<td>Grant support from UNHCR¹</td>
</tr>
<tr>
<td></td>
<td>Katiirwe solar mini-grid</td>
<td>&lt;1</td>
<td>50 kW Solar PV 200+ connections</td>
<td><strong>Developer:</strong> PowerGen Renewable Energy Partner: NRECA International</td>
<td>Equity from Kyegegwa Rural Electricity Co-operative Society</td>
</tr>
<tr>
<td>East</td>
<td>Suam Micro Hydropower plant</td>
<td>8</td>
<td>40kW Solar PV 126 connections</td>
<td><strong>Developer:</strong> GiZ and EnDev <strong>Partners:</strong> Former REA</td>
<td>$1.2M - $12M grant from GiZ and EnDev²</td>
</tr>
</tbody>
</table>

Industry stakeholders

- Private sector operators
- NGOs
- Financiers
- Government
- Dev partners
- Associations
- Other stakeholders

Sources: UOMA research and analysis 1. UNHCR, Uganda Factsheet, 2021 [Link] 2. SEforALL, Market study on available financial instruments in support of GMGs and assessment of GMG developer needs, 2017 [Link]
There are several up-coming mini-grids across all regions in Uganda; some of these have already raised funds from DFIs and European governments (1/2)

<table>
<thead>
<tr>
<th>Region</th>
<th>Developer/ Tender</th>
<th>Technology &amp; capacity</th>
<th>Partners and funds raised &amp; financiers</th>
</tr>
</thead>
</table>
| Central      | Bakulu Power      | • Solar mini-grid total of 600kW in Buvuma district  
• Potential to reach ~8,000 people | Partners: Former REA, Energy for Impact                           |
|              | Absolute Energy   | • Estimated capacity of 100kW Solar PV  
• Located in Kalangala District with potential impact of 5,400 people | Partners: Former REA                                             |
|              | AfDB and REA      | • (10) decentralized mini-grids on Lake Victoria                                      | Partners: Former REA                                             |
| Western      | ORIO Infrastructure Fund | • (10) mini hydro projects  
• Capacity of 50 to 500 Kw                                                      | Partners: UECCC  
Funds raised & financiers: $14.5M grant from Emerging Africa Infrastructure Fund, FMO (Dutch development Bank)¹ |
|              | Tiger power       | • (3) Solar PV arrays in Kyenjojo Uganda  
• Expected to serve 1000 households                                               | Partners: Former REA                                             
Funds raised & financiers: $738K The Belgium government² |
|              | WWF Uganda        | • (6) solar mini-grids of a total capacity of 170 kW in Kasese of Rubirizi  
• Expected to serve 900 households and 205 small businesses                      | Partners: Former REA                                           
Funders: European Union (EU)                                                        |

There are several up-coming mini-grids across all regions in Uganda; some of these have already raised funds from DFIs and European governments (2/2)

<table>
<thead>
<tr>
<th>Region</th>
<th>Developer/ Tender</th>
<th>Technology &amp; capacity</th>
<th>Partners and funds raised &amp; financiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern</td>
<td>Winch Energy</td>
<td>• Capacity of 30kW to 80kW per site&lt;br&gt;• 15 villages in Rakai &amp; Isingiro</td>
<td>Partners: GiZ and Former REA&lt;br&gt;Funds raised &amp; financiers: $28.5M grant from the German government¹</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern</td>
<td>Mandulis Energy</td>
<td>• 20MW biomass project in Gulu</td>
<td>Partners: KfW, Power Africa&lt;br&gt;Funds raised &amp; financiers: $1M grant from Sustainable Energy Fund for Africa (SEFA) and African Development Bank²</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Winch Energy</td>
<td>• Capacity of 30kW to 80kW per site&lt;br&gt;• 25 villages in Lamwo District</td>
<td>Partners: GiZ and Former REA&lt;br&gt;Funds raised &amp; financiers: $28.5M grant from the German government²</td>
</tr>
<tr>
<td>Eastern</td>
<td>Equatorial Power</td>
<td>• 600kW solar PV plant on Lolwe Island Namayingo District&lt;br&gt;• Expected to serve 3,700 connections</td>
<td>Partners: Engie³,⁴</td>
</tr>
</tbody>
</table>

## International and local NGOs are increasingly playing a role in electrification of schools and health centers (1/2)

<table>
<thead>
<tr>
<th>Business</th>
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<th>Product offering</th>
<th>Milestones and updates</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Solar sister</strong> is an international NGO that empowers women entrepreneurs through energy access</td>
<td>Residential products including lanterns and accessories</td>
<td>Powered several health centers as part of their COVID response including health centers in Pushit &amp; Amuro in N. Uganda</td>
<td></td>
</tr>
<tr>
<td>We Care Solar is a global NGO reducing maternal mortality with solar powered reliable lighting &amp; medical devices with a presence in Uganda, Liberia, Sierra Leone and Zimbabwe</td>
<td>Developed solar suitcase, a compact solar home system for maternal health facilities that includes medical lighting, phone charging, a fetal doppler, and thermometer</td>
<td>Launched the “Light every birth” program in Uganda in 2018 that included the donation of 350 solar suitcases to health centers</td>
<td></td>
</tr>
<tr>
<td>Solar Electric Light Fund (SELF) is an international NGO providing energy solutions to the last mile in partnership with development partners such UNHCR and UN Foundation</td>
<td>Residential and commercial products</td>
<td>Main contractor on a UN Foundation project that electrified 62 health centers in rural Uganda and Ghana; the electrification of 36 health centers in Uganda was sub-contracted to All in Trade</td>
<td></td>
</tr>
<tr>
<td>Little Sun is a global NGO providing small portable solar lamps for energy impoverished communities living without electricity</td>
<td>Residential products such as lanterns and lamps</td>
<td>Distributed over 6,500 lamps to communities without electricity in Uganda in partnership with Energi Nord, a Danish energy company</td>
<td></td>
</tr>
<tr>
<td>Innovation Africa is an NGO providing energy solutions for health centers and schools and has been active in 10 SSA countries including Uganda</td>
<td>Commercial products for institutional consumers including large modular systems, solar water pumps, and solar heaters</td>
<td>Electrified several schools and health centers in Uganda with systems including remote monitoring system for donors to monitor real time performance</td>
<td></td>
</tr>
</tbody>
</table>
International and local NGOs are increasingly playing a role in electrification of schools and health centers (2/2)

<table>
<thead>
<tr>
<th>Business</th>
<th>Summary</th>
<th>Product offering</th>
<th>Milestones and updates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green empowerment</td>
<td>Green empowerment is a global renewable energy non-profit working with rural communities and partners to improve access to energy</td>
<td>Commercial products for institutional consumers such as schools and hospitals</td>
<td>Launched an app for remote data collection in partnership Medical Teams to support community service providers to understand their energy needs without having technical expertise</td>
</tr>
<tr>
<td>Solar Health</td>
<td>Solar Health is a Uganda based non-profit founded in 2017 working with local and international orgs to address entrenched energy poverty</td>
<td>Commercial products for institutional consumers, including lights and solar pumps</td>
<td>Electrified 56 off-grid health centers, distributed over 144K pico lights to vulnerable communities, and established 2 women solar entrepreneur groups</td>
</tr>
<tr>
<td>Stiftung Solarnenergie</td>
<td>Stiftung Solarnenergie is a German based NGO that promotes reliable, affordable and environmentally friendly energy for households and institutions</td>
<td>Commercial and industrial products for institutions such as schools and health centers</td>
<td>Supported the electrification of 43 health centers in partnership with Sendea association and Signify Foundation</td>
</tr>
<tr>
<td>Solar Aid</td>
<td>Solar Aid is an international development charity working to create a sustainable market for solar lights in Africa</td>
<td>Residential products such as solar lights, lamps, and lanterns</td>
<td>Opened offices in Uganda in 2014 and set up an entity now running as Xpreme Solar Solutions which has distributed over 80K solar lights</td>
</tr>
<tr>
<td>Joint Energy and Environment Projects (JEEP)</td>
<td>Joint Energy and Environment Projects (JEEP) is an NGO working for an environmentally safe and clean Uganda</td>
<td>Commercial products targeted at institutional consumers such as solar lighting, phone charging &amp; refrigerators</td>
<td>Electrified 63 schools with lighting systems, set up phone charging systems for 4 communities, and provided refrigerators to 3 health centers</td>
</tr>
</tbody>
</table>
There have been many recent debt deals in the region.

<table>
<thead>
<tr>
<th>Investor</th>
<th>Company</th>
<th>Amount</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSD Africa Investments</td>
<td>Nithio FI</td>
<td>US$4.5M</td>
<td>2021</td>
</tr>
<tr>
<td>Development Finance Corporation</td>
<td>Nithio FI</td>
<td>US$10M</td>
<td>2021</td>
</tr>
<tr>
<td>SunFunder</td>
<td>Winch Energy</td>
<td>US$2M</td>
<td>2021</td>
</tr>
<tr>
<td>SEED</td>
<td>Peec Energy</td>
<td>US$2M</td>
<td>2021</td>
</tr>
<tr>
<td>EDFI-ElectriFI</td>
<td>Nithio FI</td>
<td>US$5M</td>
<td>2020</td>
</tr>
<tr>
<td>FMO</td>
<td>Greenlight Planet</td>
<td>US$5.3M</td>
<td>2020</td>
</tr>
<tr>
<td>European Investment Bank</td>
<td>Fenix</td>
<td>US$12.5M</td>
<td>2019</td>
</tr>
<tr>
<td>SunFunder, Developing World Markets, SIMA, responsibility</td>
<td>d.Light</td>
<td>US$18M</td>
<td>2019</td>
</tr>
<tr>
<td>Lion's Head Global partners</td>
<td>BBOXX</td>
<td>US$8M</td>
<td>2019</td>
</tr>
<tr>
<td>TRINE</td>
<td>Greenlight Planet</td>
<td>US$2.2M</td>
<td>2019</td>
</tr>
<tr>
<td>SunFunder, responsAbility, Oikokredit</td>
<td>SolarNow</td>
<td>US$9M</td>
<td>2019</td>
</tr>
<tr>
<td>responsAbility, SunFunder, European Investment Bank, SIMA Funds</td>
<td>d.light</td>
<td>US$50M</td>
<td>2018</td>
</tr>
<tr>
<td>Bamboo Capital Partners</td>
<td>BBOXX</td>
<td>US$50M</td>
<td>2018</td>
</tr>
<tr>
<td>ElectriFI, TRINE</td>
<td>Azuri</td>
<td>US$20M</td>
<td>2018</td>
</tr>
<tr>
<td>European Investment Bank</td>
<td>d.Light</td>
<td>US$25M</td>
<td>2018</td>
</tr>
<tr>
<td>Symbiotics group, FMO</td>
<td>Zola Electric</td>
<td>US$32.5M</td>
<td>2018</td>
</tr>
<tr>
<td>SunFunder</td>
<td>Zola Electric</td>
<td>US$20M</td>
<td>2018</td>
</tr>
<tr>
<td>Finnfund</td>
<td>Mobisol</td>
<td>US$12.4M</td>
<td>2017</td>
</tr>
<tr>
<td>Atlas Mara</td>
<td>BBOXX</td>
<td>US$2M</td>
<td>2017</td>
</tr>
<tr>
<td>Essential Capital Consortium</td>
<td>BBOXX</td>
<td>US$5M</td>
<td>2017</td>
</tr>
<tr>
<td>Responsility</td>
<td>Mobisol</td>
<td>US$12M</td>
<td>2017</td>
</tr>
<tr>
<td>Stanbic Bank, CDC, FMO, Norfund, Triodos, responsAbility, Symbiotics</td>
<td>M-KOPA</td>
<td>US$80M</td>
<td>2017</td>
</tr>
<tr>
<td>SunFunder, responsAbility, Oikocredit</td>
<td>SolarNow</td>
<td>US$6M</td>
<td>2017</td>
</tr>
<tr>
<td>SunFunder</td>
<td>SolarNow</td>
<td>US$2M</td>
<td>2016</td>
</tr>
<tr>
<td>Oikocredit International</td>
<td>BBOXX</td>
<td>US$5.3M</td>
<td>2016</td>
</tr>
<tr>
<td>Packard Foundation, Ceniarth, the Calvert Foundation</td>
<td>Off-Grid Electric</td>
<td>US$45M</td>
<td>2016</td>
</tr>
<tr>
<td>OPIC</td>
<td>SunFunder</td>
<td>US$15M</td>
<td>2016</td>
</tr>
<tr>
<td>CBA</td>
<td>M-KOPA</td>
<td>US$4M</td>
<td>2016</td>
</tr>
</tbody>
</table>

~US$80M in regional debt financing from 2019 and 2021 which is much lower than >US$380 from 2016 to 2018 figures, indicating smaller investments in recent years.

Source: Research; all data publicly available
A number of facilities have been set up in the region to promote the off-grid energy sector (1/11)

<table>
<thead>
<tr>
<th>Fund/Facility</th>
<th>Purpose</th>
<th>Focus</th>
<th>Instrument</th>
<th>Fund Size</th>
<th>Region Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>SunFunder – Solar Energy Transformation Fund¹</td>
<td>Support 50 solar companies to grow, with a potential to serving up to 3 million people</td>
<td>Solar Energy</td>
<td>Debt</td>
<td>$70M</td>
<td>East and West Africa</td>
</tr>
<tr>
<td>Mobile for Development Utilities Innovation Fund</td>
<td>Test &amp; scale the use of mobile to increase access to energy, water and sanitation</td>
<td>Seed grants and market validation grants</td>
<td>Grant</td>
<td>$2.6M</td>
<td>SSA</td>
</tr>
<tr>
<td>SunFunder – Beyond the Grid Solar Fund (BTG)²</td>
<td>Specialist debt financing partner for solar companies active in off-grid residential, commercial &amp; industrial</td>
<td>Off-grid, productive use and C&amp;I solar</td>
<td>Debt</td>
<td>$50M</td>
<td>East and West Africa</td>
</tr>
<tr>
<td>Global LEAP Awards</td>
<td>Highly energy-efficient, durable, off- and weak-grid appropriate refrigerators. Awards are ongoing on an annual basis</td>
<td>Productive use</td>
<td>£100k</td>
<td>Dependent on co. &amp; funds raised</td>
<td>SSA</td>
</tr>
</tbody>
</table>

A number of facilities have been set up in the region to promote the off-grid energy sector (2/11)

<table>
<thead>
<tr>
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<th>Region Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIMA Fund for Off-grid solar¹</td>
<td>Provide commercial capital and advisory to energy businesses with financial, social, and env. impact</td>
<td>High risk, earlier stage businesses</td>
<td>Debt</td>
<td>$90M</td>
<td>SSA</td>
</tr>
<tr>
<td>Solar Frontier Capital</td>
<td>Provide local currency lending for pay-as-you-go off-grid solar companies across sub-Saharan Africa</td>
<td>PAYG companies</td>
<td>Debt</td>
<td>$100M</td>
<td>Africa</td>
</tr>
<tr>
<td>Off-grid Energy Access Fund²</td>
<td>Catalyze local financial markets’ support for innovative energy access strategies</td>
<td>The household energy access sector including distributors, manufacturers &amp; credit providers</td>
<td>Debt</td>
<td>$500M</td>
<td>SSA</td>
</tr>
<tr>
<td>TRINE</td>
<td>Invest in solar energy in growing markets</td>
<td>Solar Energy</td>
<td>Crowdfunding</td>
<td>Dependent on co. &amp; funds raised</td>
<td>SSA</td>
</tr>
</tbody>
</table>

A number of facilities have been set up in the region to promote the off-grid energy sector (3/11)

<table>
<thead>
<tr>
<th>Fund/Facility</th>
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<th>Instrument</th>
<th>Fund Size</th>
<th>Region Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pioneer Energy Investment Initiative</td>
<td>Support, scale, and learn from innovative energy companies impacting 8 M people through Acumen’s portfolio by 2026</td>
<td>Energy generation (SHS, Solar &amp; hybrid mini-grids) &amp; Energy usage (Innovations for energy use)</td>
<td>Common &amp; Preferred Equity, Convertible Debt</td>
<td>$22.8M</td>
<td>East &amp; West Africa</td>
</tr>
<tr>
<td>Energy Entrepreneur Fund</td>
<td>Dev. of state-of-the-art tech., products &amp; processes in energy efficiency, power generation, heat and electricity storage</td>
<td>SME’s Incubation support</td>
<td>Mezzanine debt</td>
<td>$50M</td>
<td>SSA</td>
</tr>
<tr>
<td>ResponAbility Energy Access Fund</td>
<td>Provide working capital to manufacturers &amp; distributors of modern energy products</td>
<td>Solar, biomass, geothermal &amp; wind distributed generation (captive generation &amp; mini-grids)</td>
<td>Equity and quasi equity</td>
<td>$30M</td>
<td>Kenya, UG, TZ, Rwanda</td>
</tr>
<tr>
<td>African Renewable Energy Fund</td>
<td>Increase renewable energy generation in Africa</td>
<td>Small hydro, wind, geothermal, solar, stranded gas and biomass projects</td>
<td>Equity</td>
<td>$10M – 30M / co</td>
<td>SSA excluding SA</td>
</tr>
</tbody>
</table>

Sources: 1. Get.Invest, 2021
A number of facilities have been set up in the region to promote the off-grid energy sector (4/11)

<table>
<thead>
<tr>
<th>Fund/Facility</th>
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<th>Fund Size</th>
<th>Region Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Efficiency for Access Coalition</strong></td>
<td>Support &amp; accelerate innovation in off-grid and weak grid appliance tech and markets; fund applications closed in 2019</td>
<td>Productive use</td>
<td>Grant</td>
<td>$1M</td>
<td>SSA</td>
</tr>
<tr>
<td><strong>Facility for Energy Inclusion Off-Grid Energy Access Fund</strong></td>
<td>Development of state of the art tech., electricity storage</td>
<td>SME's Incubation support</td>
<td>Mezzanine debt</td>
<td>$50M</td>
<td>SSA</td>
</tr>
<tr>
<td><strong>EU-Africa Infrastructure Trust Fund</strong></td>
<td>Mobilize additional finance for infrastructure projects in sub-Saharan Africa; fund applications closed in 2019¹</td>
<td>Geothermal, hydropower, solar &amp; wind power, transmission lines, sustainable cooking fuels</td>
<td>Grants blended with long term financing</td>
<td>~$920M</td>
<td>SSA</td>
</tr>
<tr>
<td><strong>Emerging Africa Infrastructure Fund</strong></td>
<td>Encourage and mobilize private investment in infrastructure in SSA to promote economic dev't</td>
<td>Energy, Transport Water &amp; Sanitation ICT, Agribusiness &amp; Mining</td>
<td>Senior, subordinated or mezzanine debt</td>
<td>~$1.2M</td>
<td>SSA</td>
</tr>
</tbody>
</table>

Sources: European Union Africa, infrastructure trust fund, More than 12 years of EU AITF involvement coming to an end, 2019
A number of facilities have been set up in the region to promote the off-grid energy sector (5/11)

<table>
<thead>
<tr>
<th>Fund/Facility</th>
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<th>Focus</th>
<th>Instrument</th>
<th>Fund Size</th>
<th>Region Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development Innovation Ventures</td>
<td>Provide flexible, tiered grant funding to test and scale evidence-driven innovation to any development challenge</td>
<td>Sector agnostic</td>
<td>Grant</td>
<td>Not available up to $5m/co</td>
<td>Global</td>
</tr>
<tr>
<td>Sustainable Energy Fund for Africa (SEFA)</td>
<td>Support private-sector led economic growth through the efficient utilization of untapped clean energy resources</td>
<td>Clean energy</td>
<td>Grant and equity</td>
<td>$95M</td>
<td>SSA</td>
</tr>
<tr>
<td>USAID-Derisking PAYGO</td>
<td>Mobilize additional finance for SHS co.s that wish to expand sales of PAYGO SHS in refugee settlements; fund applications closed in 2019¹</td>
<td>PAYGO SHS</td>
<td>Grant</td>
<td>Not available $145k-175k/co.</td>
<td>Uganda</td>
</tr>
<tr>
<td>AlphaMundi Foundation – Powering Ag</td>
<td>Catalyse financing for businesses providing clean energy solutions that inc. ag. productivity and/or value in developing countries</td>
<td>Irrigation co.s operating at the nexus of clean energy &amp; agriculture</td>
<td>Grant, Debt, Equity or mezzanine financing</td>
<td>Not stated $100k-$2m/co</td>
<td>SSA</td>
</tr>
</tbody>
</table>

¹Source: 1. GOGLA, USAID de-risking pay-as-you-go solar home systems in Uganda refugee settlements grants program, 2019
A number of facilities have been set up in the region to promote the off-grid energy sector (6/11)

<table>
<thead>
<tr>
<th>Fund/Facility</th>
<th>Purpose</th>
<th>Focus</th>
<th>Instrument</th>
<th>Fund Size</th>
<th>Region Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEAM investment platform</td>
<td>Cloud-based platform, aiming to provide developmental infrastructure for off-grid energy services across SSA</td>
<td>Off-grid energy</td>
<td>Equity</td>
<td>$50M</td>
<td>Africa</td>
</tr>
<tr>
<td>Solar Electric Light Fund¹</td>
<td>Design &amp; implement solar energy solutions to assist people living in poverty</td>
<td>Solar</td>
<td>Grant</td>
<td>Not available</td>
<td>Uganda</td>
</tr>
<tr>
<td>Energy Access Venture Fund²</td>
<td>SMEs active in electricity generation and distribution, and electricity related services in SSA</td>
<td>SHS, Micro-grid infrastructure &amp; hybrid technologies</td>
<td>Equity and Quasi-equity</td>
<td>$55M</td>
<td>EA and Southern Africa</td>
</tr>
<tr>
<td>The EnAccess Foundation</td>
<td>Address innovation challenges that renewable energy companies face through lack of financing</td>
<td>Irrigation companies operating at the nexus of clean energy &amp; agriculture</td>
<td>Grant, Debt, Equity or mezzanine financing</td>
<td>$0.5M</td>
<td>EA and Southern Africa</td>
</tr>
</tbody>
</table>

A number of facilities have been set up in the region to promote the off-grid energy sector (7/11)

<table>
<thead>
<tr>
<th>Fund/Facility</th>
<th>Purpose</th>
<th>Focus</th>
<th>Instrument</th>
<th>Fund Size</th>
<th>Region Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biodiversity Investment Fund</td>
<td>Provide attractive loan financing for businesses that can demonstrate impact or contribution towards biodiversity in Uganda</td>
<td>Off-grid energy</td>
<td>Equity</td>
<td>$50M</td>
<td>Africa</td>
</tr>
<tr>
<td>EnDev Uganda</td>
<td>Give support in energy policy, improved biomass technologies, rural electrification &amp; energy efficiency</td>
<td>Pico PV &amp; SHS Grid densification</td>
<td>No info</td>
<td>€12.25M</td>
<td>Uganda</td>
</tr>
<tr>
<td>EEP Africa</td>
<td>Provide early stage &amp; catalytic financing to innovative clean energy projects, technologies</td>
<td>Solar PV</td>
<td>Grant</td>
<td>Not available €200k – 500k/co.</td>
<td>EA and Southern Africa</td>
</tr>
<tr>
<td>Frontier Energy II Fund</td>
<td>Develop, construct and operate renewable energy generation projects</td>
<td>Renewable energy</td>
<td>Equity or mezzanine debt</td>
<td>$60M ($227M – to verify)¹</td>
<td>SSA</td>
</tr>
</tbody>
</table>

Source: 1. Frontier Energy, Investor base, 2019
A number of facilities have been set up in the region to promote the off-grid energy sector (8/11)

<table>
<thead>
<tr>
<th>Fund/Facility</th>
<th>Purpose</th>
<th>Focus</th>
<th>Instrument</th>
<th>Fund Size</th>
<th>Region Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frontier Energy I Fund¹</td>
<td>Develop, construct and operate renewable energy generation projects; fund closed in 2017</td>
<td>Renewable energy</td>
<td>No info</td>
<td>$60M</td>
<td>East Africa</td>
</tr>
<tr>
<td>USADF SCC Grants²</td>
<td>Support businesses to identify and scale innovative efforts to address energy access gaps for refugees; the grants were awarded in 2019</td>
<td>Off-grid energy, internet and digital technology</td>
<td>Grant</td>
<td>~$370K</td>
<td>Uganda</td>
</tr>
<tr>
<td>USADF Off-Grid Energy Challenge³</td>
<td>Support entrepreneurs to develop and scale up off grid proven technologies in rural communities</td>
<td>Off-grid energy but women-led projects are targeted in Uganda</td>
<td>Grant</td>
<td>$100K/co.</td>
<td>SSA</td>
</tr>
<tr>
<td>BEAM – ElectriFI Fund⁴</td>
<td>Provide early stage equity capital for SHS distributor companies to help further unlock debt capital</td>
<td>SHS</td>
<td>Equity</td>
<td>$8M</td>
<td>Africa</td>
</tr>
</tbody>
</table>

A number of facilities have been set up in the region to promote the off-grid energy sector (9/11)

<table>
<thead>
<tr>
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<th>Fund Size</th>
<th>Region Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIMA Angaza Distributor Financing Fund¹</td>
<td>Invest in off-grid distribution companies to close cash flow gaps from customer instalment payments; fund is accepting applications</td>
<td>PAYGO companies</td>
<td>Debt</td>
<td>$5.7Billion</td>
<td>Global</td>
</tr>
<tr>
<td>Renewable Energy Challenge Fund²</td>
<td>Aim to increase adoption of off grid PV solutions that can stimulate economic activity; fund is ended in December 2020</td>
<td>Productive use, solar and clean cooking</td>
<td>Grant</td>
<td>~$4M</td>
<td>Uganda</td>
</tr>
<tr>
<td>KawiSafi Ventures Fund³</td>
<td>Invest capital to scale companies providing clean, affordable and efficient energy to low income populations</td>
<td>Off grid solar power</td>
<td>Grant and equity</td>
<td>$70M</td>
<td>East Africa</td>
</tr>
<tr>
<td>SIMA Off-Grid Solar and Financial Access Senior Debt Fund I⁴</td>
<td>Finance innovative companies that invest in, manufacture, and/or distribute individual SHS; 5-year fund since 2017</td>
<td>SHS</td>
<td>Senior debt</td>
<td>$90M</td>
<td>SSA and South Asia</td>
</tr>
</tbody>
</table>

Sources: 1. SIMA Funds, SIMA off-grid solar and financial access senior debt fund I, 2019, 2. UN Uganda, UNCDF receives Shs15.5Bn for renewable energy access, 2015, 3. Digest Africa, Acumen’s $70M fund KawiSafi Ventures has already deployed $21M, 2019, 4. SUMA Funds, SIMA Angaza distributors finance fund, 2020
A number of facilities have been set up in the region to promote the off-grid energy sector (10/11)

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Climate Investor One¹</td>
<td>Provide funding to develop renewable energy projects to reduce power deficits, energy costs and CO2 emissions</td>
<td>Clean energy</td>
<td>Debt and equity</td>
<td>$80M</td>
<td>SSA</td>
</tr>
<tr>
<td>GEEREF NeXt Funds²</td>
<td>Catalyse private sector investment for renewable energy through being an anchor investor to encourage other investors to co-invest</td>
<td>Renewable energy and energy efficiency</td>
<td>Grant, equity</td>
<td>$765M</td>
<td>Global</td>
</tr>
<tr>
<td>ARCH Africa Renewable Power Fund (ARPF)³</td>
<td>Invest capital to scale companies providing clean, affordable and efficient energy to low income populations</td>
<td>Wind, solar PV, hydro power, geothermal and biomass</td>
<td>Equity</td>
<td>$25M</td>
<td>SSA</td>
</tr>
<tr>
<td>Universal Green Energy Access Programme (UGEAP)⁴</td>
<td>Increase financing for renewable energy scaling up investments from local financial markets and the international private sector.</td>
<td>SHS, mini grids, on-grid installations</td>
<td>Debt, mezzanine debt, guarantees</td>
<td>$500</td>
<td>SSA</td>
</tr>
</tbody>
</table>

A number of facilities have been set up in the region to promote the off-grid energy sector (11/11)

<table>
<thead>
<tr>
<th>Fund/Facility</th>
<th>Purpose</th>
<th>Focus</th>
<th>Instrument</th>
<th>Fund Size</th>
<th>Region Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beyond the Grid Fund For Africa (BGFA3)¹</td>
<td>Establish up to 600,000 energy connections and benefit more than 3 million people in remote areas of Uganda.</td>
<td>Clean energy</td>
<td>Grant</td>
<td>€ 20.7M</td>
<td>Uganda</td>
</tr>
<tr>
<td>Nithio Financial Intermediary</td>
<td>Utilize innovative AI-enabled platform to finance off-grid energy companies; includes receivables and inventory financing</td>
<td>Mini-grids, SHS, Productive use, Microfinance</td>
<td>Debt</td>
<td>$ 24.5M</td>
<td>East and West Africa</td>
</tr>
<tr>
<td>SIMA Energy Access Relief Fund (EARF)</td>
<td>Provide affordable financing to support off-grid solar firms facing financial issues due to disruptions caused by COVID-19</td>
<td>SHS</td>
<td>Debt</td>
<td>$68 million</td>
<td>Sub-Saharan Africa and Asia</td>
</tr>
</tbody>
</table>

Source: 1. Beyond the Grid Fund For Africa, [Link](#)
The Ministry of Energy and Mineral Development and several other agencies are dedicated to advancing access to energy

<table>
<thead>
<tr>
<th>Government body</th>
<th>Mandate in industry</th>
</tr>
</thead>
</table>
| **Ministry of Energy and Minerals Development (MEMD)** | • Has the overarching mandate to promote development of sustainable use of energy and mineral resources  
• Renewable energy department serves under this Ministry and runs a number of the programs for access both for on- and off-grid energy  
• Recently re-absorbed the Rural Electrification Agency (REA) that had a mandate to support rural electrification access with special regard to marginalized communities |
| **Electricity Regulatory Authority (ERA)** | • Regulates the electricity supply industry and issues licenses for generation, transmission, distribution or sales of electricity, as well as ownership or operation of transmission systems  
• Establishes tariff structures and investigates tariff charges, approves rates, terms, and conditions of electricity services provided by generation, transmission, and distribution companies |
| **Uganda Energy Credit Capitalization Company (UECCC)** | • Facilitates investments in renewable energy sector by providing financing products and technical assistance to firms in the sector  
• Channels investment to projects as the administrator of Uganda Energy Capitalization Trust, the framework for pooling resources from government and development partners |

Most notable change has been the reabsorption of REA into MEMD, with rural electrification ownership transferred back to the ministry

Source: UOMA interviews & consultations, supplemented by 1. UECC, About UECCC, 2020
Several additional government institutions are interlinked with oversight on issues affecting off-grid.

Head of State

- Provides executive oversight
- Provides policy direction

Cabinet

Parliament

Office of the Prime Minister

Ministries

Ministry of Energy and Mineral Development

Ministry of Finance, Planning & Economic Development

Ministry of Trade, Industry & Cooperatives

Ministry of Water & Environment

Key

- Official relationship and reporting requirements
- Frequent interaction, no official reporting requirement

Electricity Regulatory Authority

Uganda Energy Credit Capitalization Company

Private Sector Foundation Uganda

National Planning Authority

Uganda Revenue Authority

Uganda National Bureau of Standards

National Environment Management Authority

Uganda Electricity Generation Company Ltd

Uganda Electricity Transmission Company Ltd

Uganda Electricity Distribution Company Ltd

Industry stakeholders

Private sector operators

NGOs

Financiers

Government

Dev partners

Associations

Other stakeholders

Source: Analysis from interviews and government websites
The European Union is supporting a number of programs to influence the private sector and advance off-grid access (1/5)

**Program:** Scaling-up rural electrification using innovative solar photovoltaic (PV) distribution models

**Overview**
- **Target action:** Scale up the use of solar PV systems at schools, health centers, and business levels in the districts of Kasese, Arua, Masindi and 17 other districts in Albertine & build local capacity to install & maintain solar PV systems
- **Project status:** Ongoing
- **End date:** 2023
- **Target industry:**

**Approach**
- Provide business training & specific solar PV energy training to CBOs
- Provide 51 social institutions with solar PV systems
- Set up solar mini-grids in 6 trading centers in Kasese and Rubiziri districts

**Impact to date**
- 3,000 households connected to solar home systems
- Solar systems (1000W each) installed in 31 schools and 20 health centers in 6 districts
- Contractor selected for installation & management of 6 mini-grids
- Capacity of CBOs to install & manage solar photovoltaic technology strengthened

**Affiliated organizations**

**Implementers:**
- WWF in partnership with Kasese District Local Government and Enterprise Uganda Foundation

**Funders:**
- ACP-EU

Sources: 1 WWF, Scaling-Up Rural Electrification, 2019 [Link]
The European Union is supporting a number of programs to influence the private sector and advance off-grid access (2/5)

Program: Access to energy services in rural and peri-urban areas in Northern Uganda (Teko Wa Project)

Overview

- **Target action:** Sustainable management of bio – energy resources, increasing use by households and social institutions of solar PV energy and energy efficient cook stoves
- **Project status:** Closed
- **End date:** April 2020
- **Target industry:**

---

Approach

- Provide a no. of social institutions with energy efficient cook stoves & solar systems
- Disseminate, in co-operation with private companies, SHS and cooking stoves to households
- Include awareness and build capacities of local communities in sustainable management of bio- energy resources

Impact to date

- 2,924 ha of woodlots and orchards established within by the project and a number of tree seedling businesses set up
- 35,366 households and 24 institutions accessed energy efficient stoves
- 25,750 households and 24 institutions accessed with solar home systems for lighting

Affiliated organizations

**Implementers:**
Church of Sweden in Partnership with Lutheran World Federation Uganda

**Funders:**
EU

Source: UOMA interviews & consultations
The European Union is supporting a number of programs to influence the private sector and advance off-grid access (3/5)

Program: Scaling up access to modern electricity services on a regional scale in rural Sub-Saharan Africa by means of a fee for service business model

Overview

• **Target action:** Working to scale up access, in the predominantly rural, poor communities of the targeted countries in Cameroon, Mali, Uganda and Guinea-Bissau
• **Project status:** Closed
• **End date:** December 2020
• **Target industry:**

Approach

• Provide several households and SMEs with access to energy services via SHS and solar mini-grids
• Facilitate bi-annual workshops for areas in the four countries concerned

Impact to date

• The project has 3,460 new SHS customers in Mali and Uganda (42% of the target). Target achieved in Mali and 60% customers recruited in Uganda.
• 4,496 SHSs have been installed in Mali, Guinea-Bissau and Uganda.

Affiliated organizations

**Implementers:**
Foundation Rural Energy Services

**Funders:**
ACP-EU

Source: UOMA interviews & consultations
The European Union is supporting a number of programs to influence the private sector and advance off-grid access (4/5)

Program: The Uganda Green Enterprises Finance Accelerator (UGEFA)

Overview

- **Target action:** Offers integrated package of enterprise capacity building through workshops and peer mentoring for investor readiness and;
  - Facilitation of tailored and accessible loans in partnership with local banks and;
  - Building an a supportive ecosystem around green SMEs by training business advisors and trainings for financial institutions
- **Project status:** Ongoing
- **End date:** N/A
- **Target industry:**

<table>
<thead>
<tr>
<th>Implementers:</th>
<th>Funder:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finding XY, Adelphi</td>
<td>EU</td>
</tr>
</tbody>
</table>

Impact to date

- Announced first call for application and admitted first cohort of businesses into the accelerator
- Announced second call for applications for green enterprises
- Signed MOUs with three Uganda banks including Yako Bank Limited, Equity Bank Limited and Opportunity Bank Limited to begin lending to entrepreneurs

Approach

- The fund discounts loans of between US$ 10,000 to US$ 100,000 with 1/3 of the total loan amount repaid directly by a UGEFA grant, thereby reducing total principal and interest repayment amounts
- Additionally, investees receive 6 months of technical assistance to help restructure operations to build resilience under COVID-19

Affiliated organizations

Industry stakeholders

Private sector operators | NGOs | Financiers | Government | Dev partners | Associations | Other stakeholders
--- | --- | --- | --- | --- | --- | ---
The European Union is supporting a number of programs to influence the private sector and advance off-grid access (5/5)

Program: COVID-19 Economic Relief Fund For The Off-Grid Solar And Cook Stove Sector

Overview

- **Target action:** To temporarily cover the costs of households to maintain their solar PAYGO systems, to temporarily cover solar and ICS companies’ operating costs to maintain their activity and to implement trainings, while also allowing for strategic investments that increase the companies’ resilience and future growth potential;
- **Project status:** Closed
- **End date:** March 2021
- **Target industry:**

<table>
<thead>
<tr>
<th>Industry stakeholders</th>
<th>Private sector operators</th>
<th>NGOs</th>
<th>Financiers</th>
<th>Government</th>
<th>Dev partners</th>
<th>Associations</th>
<th>Other stakeholders</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Approach</th>
</tr>
</thead>
</table>
| • COVID-19 Relief to SMEs covering customer monthly payments– to mitigate loss of energy access in Ugandan households and the losses of energy access companies Provide ICS and solar companies funding to invest into their company for production and distribution infrastructure
| • Develop the training offer from sector associations and other entities

<table>
<thead>
<tr>
<th>Impact to date</th>
</tr>
</thead>
</table>
| • Disbursed grant support to 26 off-grid solar and improved cook stove companies ranging from early-stage to mature

<table>
<thead>
<tr>
<th>Affiliated organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Implementers:</strong></td>
</tr>
<tr>
<td>PSFU, EnDev</td>
</tr>
<tr>
<td><strong>Funders:</strong></td>
</tr>
<tr>
<td>EU</td>
</tr>
</tbody>
</table>

Source: UOMA interviews & consultations
World Bank has partnered with the government to implement the 15-year ERT initiative to improve lives of rural households

Program: Energy for Rural Transformation Phase III (ERT-3)

Overview

- **Target action:** Increase access to electricity in rural Uganda, with focus on three components:
  - On grid access
  - Off-grid access
  - Institutional strengthening through impact monitoring
- **Project status:** Ongoing; near completion
- **End date:** December 2021
- **Target industry:**

Approach

**Off-grid component:**
- Installation of solar PV systems for public institutions in rural areas
- Business development support
- Provision of credit facilities & quality standards enforcement support

Impact to date

- USD 8.5 million fund to disbursed to local banks to provide working capital financing to SHS PAYG operators
- 944,963 people provided with access to electricity by household
- 37,364 people provided with electricity using off-grid and mini-grid solutions
- 329 health centers provided with access to electricity

Affiliated organizations

**Implementers:**
- REA, MOWE, MOH, MOESD, UECCC, PSFU & MEMD

**Funders:**
- World Bank/GEF

Sources: UOMA interviews & consultations, supplemented by
World Bank also runs independent programs to advance access & create a conducive environment for private sector growth

Program: Lighting Africa Campaign

Overview

- **Target action:** Enable access to off-grid lighting and energy products for 250 million people across sub-Saharan Africa by 2030
- **Project status:** Ongoing; near completion
- **End date:** December 2021
- **Target industry:**

Catalyze the market through:

- Market intelligence and quality assurance
- Access to finance
- Consumer education, business development support and policy and regulation support

Impact to date

- Market assessment study to determine demand for solar products, market bottlenecks, & assess options for supporting the growth; consumer awareness campaigns
- Supporting UNBS in adopting and enforcing internationally recognized standards
- 2M people impacted, ~920k quality products sold & ~185k GHG gas emissions avoided

Affiliated organizations

- **Implementers:**
  - Broad global alliance – imps. varying by country
- **Funders:**
  - World Bank / IFC

Source: UOMA interviews & consultations, supplemented by
1. Lighting Africa, Uganda - Enabling a market-led approach, 2018,
Additionally, World Bank is partnering with the government on an initiative on to scale up energy access for households, businesses and public institutions.

**Program:** Uganda Electricity Access Scale-up Project (EASP)

**Target action:** To increase access to energy for households, commercial enterprises, industrial parks, and public institutions

**Project status:** Pipeline, Kick off expected in 2022

**End date:** N/A

**Target industry:**

- SHS
- On-grid
- Mini-grids

### Overview

**Approach**

Catalyze the market through:

- Market intelligence and quality assurance
- Access to finance
- Consumer education, business development support and policy and regulation support

**Impact to date**

- Currently holding workshops to get input from various stakeholders
- USD 400 million in funding commitments

**Affiliated organizations**

**Implementers:**

- Ministry of Energy and Mineral Development (MEMD), Uganda Energy Credit Capitalization Company (UECCC)

**Funders:**

- World Bank/IDA/IBRB

USAID’s Power Africa is playing a crucial role in leading and coordinating initiatives in Uganda (1/8)

Program: The Power Africa Uganda Electricity Supply Accelerator

Overview

- **Target action:** Facilitate the increase of clean energy electricity generation and electricity access among rural and urban communities in Uganda by working with clean energy generation and access project developers to reach financial close and project commissioning, and enhance the enabling environment for clean energy investment
- **Project status:** Closed
- **End date:** 2020
- **Target industry:**

<table>
<thead>
<tr>
<th>Industry stakeholders</th>
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<th>NGOs</th>
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<th>Government</th>
<th>Dev partners</th>
<th>Associations</th>
<th>Other stakeholders</th>
</tr>
</thead>
</table>

### Approach

- Supported generation and access projects through grants, transaction advisory support, short term technical assistance and linkages with other Power Africa partner tools

### Impact to date

- Power Africa, developed the national electricity connections Policy (ECP) in 2018 through which 223,058 on grid connections have been made, 1+ M people provided with access to power & ~USD 42 M mobilized
- Supported various sector stakeholders including USEA, REA and private operators such as Mandulis Energy

### Affiliated organizations

- **Implementers:**
  - Energy and Security Group
- **Subcontractors:**
  - NRECA International
  - Nexant
  - African Solar Designs
  - Konserve Advisory Services
- **Funders:**
  - World Bank/IDA/IBRB

Sources: UOMA interviews & consultations, supplemented by
1. USAID, *Uganda Electricity Supply Accelerator increases energy access in Uganda*, 2020
USAID’s Power Africa is playing a crucial role in leading and coordinating initiatives in Uganda (2/8)

**Program:** Quality Assurance Framework for Mini-Grids¹

**Overview**

- **Target action:** Address some of the root challenges of providing safe, quality, and financially viable mini-grid power systems to remote customers
- **Project status:** Ongoing
- **End date:** N/A
- **Target industry:**

  - Mini-grids

**Approach**

- Provide a flexible alternative to rigid top-down standards by defining:
  - Levels of service framework
  - Accountability and performance reporting framework

**Impact to date**

- Provided a formalized, common standard for classifying energy consumers
- Facilitated aggregation of mini-grid projects & unlock private investment from data generated
- Supporting implementation of consumer protections, thus a better consumer service

**Affiliated organizations**

- **Implementers:** NREL, DOE
- **Funders:** World Bank/IDA/IBRB

---

¹ Source: USAID interviews & consultations

USAID’s Power Africa is playing a crucial role in leading and coordinating initiatives in Uganda (3/8)

**Overview**
- **Target action:** To increase energy access through solar home systems (SHS) to last-mile households in Uganda by incentivizing off-grid solar companies to develop sustainable business models towards reaching the last mile
- **Project status:** Ongoing
- **End date:** 2022
- **Target industry:**

<table>
<thead>
<tr>
<th>Program: Last Mile Distribution Results-Based Finance</th>
</tr>
</thead>
</table>

**Approach**
- The project’s strategy is to temporarily lower the cost of extending off-grid solar companies service coverage for Tier 2 products to last-mile areas and provide a risk protection mechanism for customer payment defaults. This strategy will be achieved through provision of up to three types of results-based financing incentives to companies selling solar home systems (SHS)

**Impact to date**
- Announced a call for proposals for first phase in November 2020

**Affiliated organizations**
- **Implementers:** EnDev, PSFU
- **Funders:** USAID

Source: UOMA interviews & consultations
**USAID’s Power Africa is playing a crucial role in leading and coordinating initiatives in Uganda (4/8)**

**Program: Electricity Expansion and Improvement program**

**Overview**
- **Target action:** Rapidly increase electricity access in its rural areas
- **Project status:** Ongoing
- **End date:** 2022
- **Target industry:**
  - SHS
  - Mini-grids
  - On-grid

**Approach**
- Develop 12 new master plans for all the rural service territories in Uganda
- Support REA to develop a connections policy
- Support REA to develop an Off-grid Policy

**Impact to date**
- The first 3 masterplans completed & identified >100 mini-grid sites in only 3 service territories
- > 120,000 new connections identified within the existing distribution footprint
- Electricity Connections Policy developed could add 1,400,000 new connections by 2022

**Affiliated organizations**
- **Implementers:** NRECA, REA
- **Funders:** Power Africa

Source: UOMA interviews & consultations
**USAID’s Power Africa is playing a crucial role in leading and coordinating initiatives in Uganda (5/8)**

**Program:** Uganda Electricity Regulatory Partnership

**Overview**

- **Target action:** Support the development of a regulatory and policy framework for electricity access with focus on the role of mini-grids to address the electricity needs of rural customers
- **Project status:** Ongoing
- **End date:** N/A
- **Target industry:** Mini-grids

**Approach**

- Develop a practical guide to the regulatory treatment of mini-grids to outline the practical issues and potential decision-making tracks for regulators
- Implement a technical workshop on mini-grid technical, performance and interconnection guidelines to assist ERA in developing tailored technical and performance guidelines for mini-grid providers of electricity in rural service territories

**Impact to date**

- Examined international best practices on mini-grid technical requirements (e.g. interoperability, compatibility)
- Developed an outline on mini-grid technical requirements, interconnection to the national grid and business models for interconnection, power quality, and service quality
- Developed an isolated mini-grid regulation that was passed into law

**Affiliated organizations**

- **Implementers:** NRECA, ERA
- **Funders:** USAID / Power Africa

Source: UOMA interviews & consultations, supplemented by USAID Electricity Regulatory Partnership: Supporting improved electricity service for all Ugandans, 2020
USAID’s Power Africa is playing a crucial role in leading and coordinating initiatives in Uganda (6/8)

Program: Power Africa Off-grid Project

Overview

- **Target action:** Support the development of Africa’s off-grid solar home system (SHS) and mini-grid sectors by providing technical assistance and targeted grant funding
  - Advance the role of the private sector in extending energy access by working with companies, investors and governments through a team of technical advisors
- **Project status:** Ongoing
- **End date:** N/A
- **Target industry:**

<table>
<thead>
<tr>
<th>SHS</th>
<th>Mini-grids</th>
<th>On-grid</th>
</tr>
</thead>
</table>

Approach

- Offering broad-based market intelligence to investors/financiers to inform financial product design
- Advising governments on establishing supportive policy frameworks, and providing hands-on support to companies

Impact to date

- Supported several local SMEs with CFO support and treasure management; Offered sales and marketing support to local SMEs; Offered transaction advisory to local SMEs in the energy sector
- Conducted a market assessment for SMEs in Northern Uganda
- Drafted a country brief for Uganda
- Provided advisory support to 5 entities resulting in 5.5m USD in capital raised

Affiliated organizations

**Implementers:**
Open Capital, Persistent Energy and various others

**Funders:**
USAID / Power Africa

Source: UOMA interviews & consultations, supplemented by 1.PAOP, *Connecting a continent beyond the grid* 2021
USAID’s Power Africa is playing a crucial role in leading and coordinating initiatives in Uganda (7/8)

**Program:** USAID Uganda’s Strategic Investment Activity (SIA)\(^1\)

### Overview

- **Target action:** USAID Uganda’s Strategic Investment Activity (SIA) works to accelerate and grow the investment ecosystem by increasing transparency, lowering transaction costs and risks, and creating partnerships that unlock commercial investments in productive use of energy, health and agriculture sectors
- **Project status:** Ongoing
- **End date:** 2026
- **Target industry:**
  - [Image: Prod. use]

### Approach

- To create a pipeline of up to 40 investable companies in energy & other sectors
- For transactions < 500K the Activity mobilizes local service providers through results-based grants and subcontracts to facilitate deals to close
- For transactions > 500K partners apply blended finance tools to de-risk larger investments and provide capital structuring, deal monitoring, and aftercare support

### Impact to date

- Uganda SIA is working to mobilize $140 million in additional private capital in agriculture, health, and productive use of energy, improving the livelihoods of 100,000 underrepresented and marginalized people in Feed the Future zones

### Affiliated organizations

- **Implementers:**
  - Chemonics
- **Subcontractors:**
  - Open Capital, Cross Boundary
- **Funders:**
  - USAID / Power Africa

Source: UOMA interviews & consultations, supplemented by 1.Chemonics, The Uganda Strategic Investment Activity, 2021
USAID’s Power Africa is playing a crucial role in leading and coordinating initiatives in Uganda (8/8)

Program: Power Africa COVID-19 response

Overview

- **Target action:** Power Africa’s COVID-19 response is working to support partner countries respond to the health crisis and to boost self-reliance for economic recovery
- **Project status:** Ongoing
- **End date:** N/A
- **Target industry:**

Approach

- Providing demand-driven assistance to companies, investors, and industry associations aimed at ensuring business continuity, mobilizing relief funding, and advocating for government policies that recognize energy access as essential
- Electrifying rural health centers to ensure reliable energy supply given the need to power diagnostic equipment, ventilators, and cold chain demands

Impact to date

- Connected the health center on Bugala Island to the mini-grid to support COVID-19 resilience
- Disbursed two grants totaling $363,607 to electrify seven healthcare facilities that provide maternal and child health services in Malawi and Uganda; The Uganda grant totaling USD ~225K was awarded to Sustain Solar to electrify 5 health centers in Namayingo Islands in partnership with Equatorial Power

Affiliated organizations

- **Implementers:** Sustain Solar
- **Subcontractors:** Equatorial Power
- **Funders:** USAID / Power Africa

Sources: UOMA interviews & consultations,
FCDO initiatives work to increase investment in off-grid energy firms, overcome regulatory barriers & foster innovation (1/4)

**Overview**

- **Target action:** Accelerate expansion of household solar market to help bring universal electricity access in Africa forward from 2080 on current trends to 2030
- **Project status:** Closed
- **End date:** 2020
- **Target industry:**

  - SHS
  - Mini-grids

**Approach**

- Campaign to improve policy and support conditions to accelerate market-based SHS delivery
- Core tool is Energy Africa Country Compacts matched with a coordinated multi-donor support offer

**Impact to date**

- Coordinated & signed Energy Africa Compact with Ug government and other stakeholders making commitment to address several challenges facing the SHS market
- Market assessment to be conducted in all countries in then campaign

**Affiliated organizations**

- **Implementers:** MEMD, DFID, REA, SE4ALL, USEA, USAID / Power Africa, UNCDF, et al.
- **Funders:** DFID

FCDO initiatives work to increase investment in off-grid energy firms, overcome regulatory barriers & foster innovation (2/4)

**Overview**

- **Target action:** Address critical evidence gaps, test innovative technology applications, business models, financing, & skills development to accelerate the provision of affordable, clean energy-based services to poor households & enterprises

- **Project status:** Ongoing

- **End date:** N/A

- **Target industry:**
  - SHS
  - Cook stoves
  - Bio fuels

**Program:** Transforming Energy Access (TEA)

**Approach**

- Partnership with Shell Foundation to support private sector innovations
- Support Innovate UK’s Energy Catalyst to stimulate technology innovation
- Build other strategic innovation partnerships

**Impact to date**

- Shell Foundation created Uganda Off-Grid Energy Market Accelerator to advance off-grid access
- Testing P2P Solar crowding platform
- Scoping potential partnership with Gates Foundation on Mission Innovation

**Affiliated organizations**

**Implementers:**
- Shell Foundation, Innovate UK

**Funders:**
- DFID

Sources: UOMA interviews & consultations, supplemented by

FCDO initiatives work to increase investment in off-grid energy firms, overcome regulatory barriers & foster innovation (3/4)

**Overview**

- **Target action:** Catalyze a market-based approach for private sector delivery of solar home system (SHS) products and services which will lead to improved energy access to people across 14 countries in SSA
- **Project status:** Ongoing in Zambia, Nigeria and Ethiopia; Closed in Uganda
- **End date:** 2023
- **Target industry:**
  - SHS
  - Mini-grids

**Approach**

- Provide TA to improve the enabling environment for market-based approach for private sector delivery of SHS
- Finance businesses wanting to enter new and emerging SHS markets in SSA
- Test innovative approaches to stimulating private sector investment and market development

**Impact to date**

- REACT-HS awarded US$ 7.4 million to 10 household solar companies with 8 disbursements beginning
- Invested US$ 72.7M in technical assistance services to governments & companies entering the solar industry
- Invested US$ 25M in development of the mini-grids sector

**Affiliated organizations**

- **Implementers:** AECF, TBC, IFC, DAI
- **Funders:** DFID, World Bank, AfDB

Sources: UOMA interviews & consultations supplemented by 1. UKaid, *Africa Clean Energy Programme (ACE)*, 2019
FCDO initiatives work to increase investment in off-grid energy firms, overcome regulatory barriers & foster innovation (4/4)

**Program**: Renewable Energy and Adaptation to Climate Technologies (REACT) Window, Africa Enterprise Challenge Fund

**Overview**
- **Target action**: Incentivizing private sector delivery of low-cost clean energy and climate adaptation technologies to help rural beneficiaries adjust to climate change and escape poverty using grant funding to catalyze greater investments into these sectors
- **Project status**: Closed
- **End date**: July 2021
- **Target industry**: SHS

**Approach**
- Facilitate a market driven approach to increased energy access through off-grid renewable energy, as well as increasing resilience & adapting to climate change in rural areas

**Impact to date**
- Helping to demonstrate the viability of many of the companies that have accessed commercial investment (e.g. M-KOPA, Mobisol and Off-Grid Electric)
- Had invested >US$ 20.6M by 2017 to developing low-cost clean energy and climate change technologies in selected African countries

**Affiliated organizations**
- **Implementers**: AECF
- **Funders**: DFID

Sources: UOMA interviews & consultations
Embassy of the Netherlands runs programs to support the private sector & advance energy access

**Overview**

- **Target action:** Provide dairy and crop farmers and their households with high quality, affordable and sustainable solar lighting systems and solar powered agricultural appliances
- **Project status:** Ongoing
- **End date:** 2023
- **Target industry:**

**Program:** The Inclusive Dairy Enterprise (TIDE) Project (Phase II)\(^1,2\)

**Approach**

- Subsidy to provide farmers with access to 20,000 solar products with reliable after sales service (Phase I)
- Encourage commercialization of the dairy sector by actively supporting farmers to adopt a business approaches to dairy farming

**Impact to date**

- Over 10,000 systems in collaboration with lead partner Solar Now
- Encouraged farmers to co-invest at total of US$ 7.4M to improve productivity
- Increased export value from dairy products, from US$ 5.6M in 2015 to US$ 111M in 2019; Regional prod. capacity increased from 100K to 1.5M litres of milk per day
- 300K students now have access to milk at school

**Affiliated organizations**

**Implementers:**
- Solar Now, Barefoot Power, Uganda Crane Creameries Cooperative Union & other value chain managers

**Funders:**
- Government of Netherlands

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Sources:
2. SNV, [The Inclusive Dairy Enterprise (TIDE) project - Phase II](https://www.snv.org/en/our-activities/dairy-enterprises/tide), 2019
UNCDF’s global CleanStart program has partnered with other dev partners to provide financing to local businesses & advance access

**Program**: CleanStart¹

**Overview**

- **Target action**: Supports low-income household transition to renewable energy
  - Co-invests in early-stage business ideas of private companies that can bring affordable clean energy
  - Emphasis on the inclusion of women and youth in value chain
  - Increase consumer-product awareness and protection
- **Project status**: Closed
- **End date**: 2020
- **Target industry**: SHS Mini-grids Cook stoves Bio fuels

**Approach**

- Performance-based grant to bring early-stage business ideas to market
- Advisory services to address implementation bottlenecks
- Research initiatives, M&E, networking events & nationwide campaigns
- Partnerships with government, dev partners, & other stakeholders to leverage resources & strengthen sustainability & impact

**Impact to date**

- Providing finance and business advisory services to 6 businesses under the Renewable Energy Challenge Fund- Clean cooking window
- Providing finance and business advisory services to 8 businesses under the Renewable Energy Challenge Fund- Solar Window
- With the Schatz Energy Research Center (SERC) Humboldt State University released study on Energy Access and Off-Grid Solar

**Affiliated organizations**

**Implementers:**
- UNCDF

**Funders:**
- RECF Uganda: Embassy of Sweden in Uganda (RECF), UNCDF, DFID Uganda
- CleanStart Global: Austrian Development Agency, Liechtenstein, Norad, Sida, UNCDF

Sources: UOMA interviews & consultations

1. UNCDF, CleanStart Program, 2020
BMZ has provided support to both the government and private sector to further advance access & support clean energy (1/3)

Program: Promotion of Renewable Energy & Energy Efficiency program (PREEEP)\(^1\)

Overview

- **Target action:** Improve framework conditions for access to clean energy in rural and urban areas
- **Focuses on four areas:**
  - Policy advise to MEMD
  - Market Development (RE and EE)
  - Skills Development (RE, PUE)
  - Decentralization activities with DLGs
- **Project status:** Ongoing
- **End date:** 2023
- **Target industry:**

<table>
<thead>
<tr>
<th>Industry stakeholders</th>
<th>Private sector operators</th>
<th>NGOs</th>
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<th>Government</th>
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<th>Associations</th>
<th>Other stakeholders</th>
</tr>
</thead>
</table>

Approach

- Support MEMD on policies & roadmaps development regarding clean energy access; Support to private sector RE&EE associations & SMEs regarding access to finance and marketing campaigns; Training in installation and maintenance of RE & EE technologies; Support districts with RE&EE planning & experience dissemination jointly with MEMD; Gender mainstreaming regarding policy and skills development

Impact to date

- Supported revision of the 2002 energy policy (2019 energy policy pending cabinet approval)
- Supported set up of District Energy Coordination Structures and planning for clean energy access in 22 districts
- Conducted energy management trainings for 100 SMEs and 40 energy audits

Affiliated organizations

- **Implementers:**
  - GIZ, MEMD, REA, ERA, 22 District Local Governments (DLGs)
- **Funders:**
  - BMZ

Source: UOMA interviews & consultations

1. GIZ, Promotion of Renewable Energy and Energy Efficiency Program (PREEEP), 2019

SHS: Solar Home Systems
Cook stoves
Mini-grids
Solar agric. app

Industry stakeholders: Private sector operators, NGOs, Financiers, Government, Dev partners, Associations, Other stakeholders
BMZ has provided support to both the government and private sector to further advance access & support clean energy (2/3)

**Program:** Promotion of Mini-grids for Rural Electrification (Pro Mini-Grids)

**Overview**
- **Target action:** Promote decentralized electrification strategies such as mini-grids to support employment and economic development
  - Develop mechanisms to support private sector capacity for installation and operation of off-grid systems
  - Develop mini grid framework conditions to enable scale up of mini grids deployment
- **Project status:** Ongoing; near completion
- **End date:** December 2021
- **Target industry:** Mini-grids

**Approach**
- Support Ministry of Energy to develop instruments for mini-grids implementation with the private sector
- Setup of up to 40 mini-grids operated with the private developers
- Support use of productive use of electricity in the mini-grids
- Train technicians for the installation and operation of decentralized systems

**Impact to date**
- Developed a tender mechanism with REA for bundled mini-grid development; installation ongoing for 25 mini-grids in Lamwo district and also developed a least cost electrification planning tool with REA for prioritization of mini-grid selection
- Developed a training program for solar electricians jointly with Nakawa Vocational Training College & Cologne Chamber of Skilled Crafts & Small Businesses & setup a Renewable Energy Training Centre at NVTC

**Affiliated organizations**
- **Implementers:** GIZ, MEMD, REA, ERA, Nakawa Vocational Training Institute, HWK
- **Funders:** EU

**Source:** UOMA interviews & consultations
1. GIZ, Pro Mini-Grids - Clean Electricity for Rural Uganda, 2018, 2. GIZ, Clean, Reliable Electricity for Rural Communities, 2016
BMZ has provided support to both the government and private sector to further advance access & support clean energy (3/3)

Overview

- **Target action:** Promotion of productive use of electricity (off-grid, mini-grids, solar irrigation)
- Energy access for primary schools, small businesses and health centers (solar PV)
- Technical advice to enterprises intending to invest into decentralized renewable energy solution such as captive power etc.
- Skills development/training on solar PV and solar irrigation and support to VTIs
- **Project status:** Ongoing
- **End date:** September 2022
- **Target industry:**

| Mini-grids | SHS | Solar agric. app |

Approach

- Set up training facilities and introduce practical curricula on solar PV and irrigation at 3 training centers; Train 50 VTI teachers and 150 renewable energy specialists in solar PV; Train 120 technicians and 180 farmers on solar-powered irrigation
- Design 50 solar-centric or solar-supported power supply systems for cooperatives, SMEs & social institutions; Rehabilitation of solar systems in 23 HCs in West Nile

Impact to date

- Solar training room, solar demo garden and computer lab set up at 1 VTI
- Developed 2 solar irrigation training manuals: one for technicians and one for users (farmers); 45 farmers and 20 technicians trained on solar irrigation
- 17 solar designs and simulations by November 2021; 3 solar PV charging stations for e-bodas installed in the Masaka corridor; 7 primary schools and 9 small businesses acquired plug-and-play solar systems

Affiliated organizations

- **Implementers:**
  - GIZ GBE Uganda
- **Funders:**
  - BMZ

Source: UOMA interviews & consultations
1. Green People Energy website [Link]
BMZ has also provided support to both the government & private sector to further advance access & support clean energy in refugee areas and host communities

**Program: Energy Solutions for Displacement Settings (ESDS)**

**Overview**

- **Target action:** Seeks to address the lack of sustainable energy supply in refugee hosting areas through advisory services and the implementation of measures in three main areas:
  - Improving the enabling environment for sustainable access to energy
  - Greening UNHCR infrastructure
  - Sustainable, energy access for households, social institutions, and SMEs
- **Project status:** Ongoing
- **End date:** December 2022
- **Target industry:**
  - Mini-grids
  - SHS
  - Cook stoves
  - Solar lantern

**Approach**

- Advisory to MEMD & UNHCR concerning energy planning & inclusion of refugees in national service delivery systems; Develop market-based approaches for replacement of diesel gensets with cost-efficient RE; Pilot & promote market-based solutions for access to sustainable cooking energy and electricity for households, institutions and businesses benefiting both refugees and host communities

**Impact to date**

- Supported the development of the Sustainable Energy Response Plan (SERP) & establishment of a taskforce within MEMD in cooperation with UNHCR, OPM, CRRF secretariat, REA and World Bank
- Established two solar energy kiosks with local community groups to offer basic energy-based products & services in Ofua III & Siripi Zones of Rhino Camp refugee settlement & supported solarisation of two health centers as part of C-19 response

**Affiliated organizations**

- **Implementers:** GIZ
- **Partners:** MEMD, OPM, UNHCR
- **Funders:** BMZ

Source: UOMA interviews & consultations, supplemented by ESDS website [link]
BMWi has provided support to both the government and private sector to further advance access & support clean energy

**Program:** Project Development Programme (PDP)

**Overview**
- **Target action:** Enhancing uptake of solar PV in the commercial and industrial sector
- **Project status:** Ongoing
- **End date:** 2023
- **Target industry:**

![Minigrids](image1) | ![SHS](image2) | ![Solar agric. app](image3)

**Approach**
- Project development support regarding Solar PV installation and reduced diesel use for private sector high power consumers >100 kW power demand
- Matchmaking with reputable German companies for project implementation
- Skilling local developers in commercial and industrial solar through the German Training Week

**Impact to date**
- First German Training week conducted with local developers and German developers
- Feasibilities studies done for 10 leads regarding solar PV installation for industries

**Affiliated organizations**
- **Implementers:** GIZ
- **Funders:** BMWi, AHK, DIHK

Source: UOMA interviews & consultations
UNDP has partnered with the government to provide sustainable energy solutions to boarding schools in off-grid areas in Uganda

**Program:** NAMA-Green Schools project

**Overview**
- **Target action:** Provide sustainable energy solutions to boarding schools in the mainly off-grid rural areas with solar energy, efficient cook stoves, and biogas technologies
- **Project status:** Ongoing
- **End date:** 2030
- **Target industry:**

  - SHS
  - Cook stoves
  - Bio fuels

**Approach**
- Create a revolving loan fund for the planned large-scale roll out of green technologies in schools & design new business models for schools to pay back installation costs; Complement technologies with capacity-building & awareness trainings for companies and a Life Skills Programme for youth & local communities and; Streamline the roles & responsibilities of public & private stakeholders

**Impact to date**
- Project has been pre-selected to receive funding by Germany and the UK of up to US$ 73.7M to support the development phase
- Installed 55K improved Institutional Cookstoves in 22K schools in rural Uganda
- Installed 1.1K biogas cook stoves fed by latrine bio-fuels
- Installed 1.6K solar PV systems in rural Uganda

**Affiliated organizations**
- **Implementers:** UNDP, MEMD
- **Funders:** UK, Germany

Source: UOMA interviews & consultations
1. GIZ, Promotion of Renewable Energy and Energy Efficiency Program (PREEP), 2019 [Link]
AFD has partnered with local banks to finance renewable energy investments in order to reduce the carbon footprint in East Africa

Program: Sustainable Use of Natural Resources and Energy Finance East Africa (SUNREF)¹

Overview

- Target action: Developing the share of renewable energy in the energy mix in East Africa
  - Improving energy efficiency for companies
  - Encouraging local banks to increase lending activities towards low-carbon projects
- Project status: Ongoing
- End date: N/A
- Target industry:
  - SHS
  - Biofuels

Approach

- Provide technical assistance to companies & banks to assist them in identifying opportunities for green investments
- Install & monitor projects
- Support partner banks in their risk assessment approach, communication strategy & marketing in green finance

Impact to date

- A cumulated commitment of > US$ 147M to finance green investments in East Africa (Uganda, Kenya and Tanzania)
- Set up the Duomo House, a solar powered commercial real estate project which received US$ 255K funding from DTB

Affiliated organizations

Implementers:
- AFD, Diamond Trust Bank

Funders:
- AFD, EU-Africa Infrastructure Trust Fund

Source: 1. Sunref, Uganda: first green energy project in construction sector, 2018 [Link]

Industry stakeholders
- Private sector operators
- NGOs
- Financiers
- Government
- Dev partners
- Associations
- Other stakeholders
UNIDO supports the EAC’s initiative aimed at refining energy policy, capacity development and knowledge management in East Africa

Program: East African Centre for Renewable Energy and Energy Efficiency (EACREEE)\(^1\)

Overview

- **Target action:** Create increased access of modern, affordable & reliable energy services
  - Increased energy security in East Africa
  - Mitigation of negative effects e.g. local pollution & greenhouse gas emissions
- **Project status:** Ongoing
- **End date:** N/A
- **Target industry:**

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<tr>
<td></td>
<td>SHS</td>
<td>Bio fuels</td>
<td>Mini-grids</td>
<td></td>
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</tbody>
</table>

Approach

- Develop & implement a coherent regional RE&EE policy framework for the EAC & facilitate its implementation on national levels
- Develop & execute regional programs and projects in cooperation with GEF, other partners and mobilize funding & provide co-funding for demand-driven programs and projects executed by the private and public sector or civil society in the region

Impact to date

- Holding of various workshops that have culminated in the formulation of an Action Plan which outlines strategies & measures for the successful implementation of the first phase of the center
- Continue to conduct training workshops and establish networking platforms & events that give industry stakeholders insights on the regional status of the off-grid energy sector

Affiliated organizations

**Implementers:**
- EACREEE

**Funders:**
- UNIDO, ADA

Source: 1.EACREEE, EACREE Regional Status report, 2016 [Link]
The Shell Foundation has launched several initiatives to catalyze sustainable and scalable solutions (1/2)

**Program:** Market Development

**Overview**
- **Target action:** Leverage foundations, govt, private sector, DFIs and other financiers to amplify impact and accelerate market growth
- **Project status:** Ongoing
- **End date:** N/A
- **Target industry:**
  - SHS
  - Mini-grids
  - Cook stoves
  - Prod. use

**Approach**
- Market institutions used to tackle barriers and facilitate effective deployment of blended capital to accelerate market growth

**Impact to date**
- Help build demand through communications and market advisory
- Providing learning and analysis for key themes such as last mile distribution, rural utilities & gender impact
- Funding for industry associations such as GOGLA, GACCC, supporting local accelerators to act as neutral market influencers such as EPD in RW and UOMA in UG & supporting innovation for market infrastructure such as impact valuation

**Affiliated organizations**

**Implementers:**
Various

**Funders:**
Shell Foundation
The Shell Foundation has launched several initiatives to catalyze sustainable and scalable solutions (2/2)

Program: Building an ecosystem to accelerate access to energy

Overview

- **Target action:** Support entrepreneurs in the off-grid sector by working with partners to provide investment, business skills and market linkages in order to scale their businesses and deepen impact on BoP
- **Project status:** Ongoing
- **End date:** N/A
- **Target industry:**

| Source: UOMA interviews & consultations |

Approach

- Provide grants, innovative financing products & technology
- Support development of business skills training & market linkages
- Provide support for development of disruptive solutions to increase the availability of energy

Impact to date

- Financing and technical assistance provided to:
- Energy Product manufacturers and service providers that providers aimed at rural households, productive use, communities and urban populations for example energy efficiency & storage, PAYG solar, waste to energy fuels etc
- Market Enablers such as supply chain intermediaries, financing facilities and catalytic institutions and bodies

Affiliated organizations

- **Implementers:** Various
- **Funders:** Shell Foundation
Signify Foundation supports youth-focused, female-focused as well as SME training activities in Uganda

**Program:** Village Academy

<table>
<thead>
<tr>
<th>Target action</th>
<th>Project status</th>
<th>Target industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>48 young men &amp; women trained to be PV solar electricians by 2018</td>
<td>Ongoing</td>
<td>SHS</td>
</tr>
<tr>
<td>60 out-of-school Ugandan &amp; urban refugee youth trained to be by 2018</td>
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<td></td>
</tr>
<tr>
<td>20 of small/medium size business owners trained in productive use of energy by 2019</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At least 60% of graduates placed in employment and/or have increased income by 3Q 2018</td>
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<td></td>
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<tr>
<td>At least 50% of trainees targeted being female graduates</td>
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</tr>
</tbody>
</table>

**Approach**

- In-village trainings for youth on technical skills, sales & soft skills necessary to enter the solar industry
- Tailor made courses for energy companies on capacity building and soft skills
- Facilitate access to start-up financing, high quality solar products & mentorship on scaling for SMEs

**Impact to date**

- Held MCE Sales Agent Training on September 2017 where 20 youth were trained as solar sales agents and equipped with stock in partnership with MCE Uganda and d.light
- Conducted Soroti Solar PV Training on May 2016 where 10 young men and women were trained and certified, 8 of whom found work in the solar industry in Soroti

**Affiliated organizations**

- **Implementers:** Village Academy
- **Funders:** Signify Foundation
Signify Foundation supported the electrification of 43 health centers in Uganda to support COVID-19 resilience

**Target action:** Improve service delivery for health centers across Uganda at the height of the COVID-19 pandemic  
**Project status:** Ongoing  
**Target industry:**

---

### Program:
Electrification of health centers in Uganda

---

### Overview
- **Target action:** Improve service delivery for health centers across Uganda at the height of the COVID-19 pandemic  
- **Project status:** Ongoing  
- **Target industry:**

---

### Approach
- Support health centers identify energy needs through a needs assessment  
- Partner with local solar associations to select and prioritize health centers to electrify  
- Electrify health centers through in-kind donation of equipment and payment of labor and transport costs

---

### Impact to date
- Electrified 43 health centers in various regions of the country; 36 health centers under the SENDEA association and the rest with various local solar operators

---

### Affiliated organizations
- **Implementers:** MEMD, MOH, SENDEA & Village Energy  
- **Funders:** Signify Foundation

---

Source: UOMA interviews & consultations
Many development partners have partnered on initiatives to further accelerate progress towards shared access goals (1/9)

Program: Energizing Development (EnDev)

Overview

• **Target action:** Achieve sustainable access to modern energy services for 21M people across 21 countries by 2021

• **EnDev Uganda (by 2024):**
  – Increasing household access to improved cooking by 680,200 people
  – Increasing access to energy for lighting/appliances for 157,800 people by mid-2019 & provide modern energy services for 1,100 social institutions & 1,600 SMEs

• **Project status:** Ongoing

• **Target industry:**
  - SHS
  - Cook stoves
  - On-grid
  - Solar lantern

Approach

• Rural partner synergy & private sector development approaches for cook stoves & solar market development; Specific focus on piloting & scaling market-based energy access in refugee & host communities; Implement innovative financing & distribution schemes; Enabling environment support including building association capacity, contributing to standards implementation & policy work

Impact to date

• Access to electricity or modern cooking equipment to over 23,8M people in private households; 29K social institutions and 74K SME’s have access to efficient & sustainable energy; Created over 29,000 jobs

• **EnDev Uganda:** 130K people gained sustained access to electricity, with 1.2M people gaining access to modern cooking energy; 760 social institutions & 995 SMEs gained sustained access to modern energy

Affiliated organizations

Implementers:
- GIZ Uganda

Funders:
- Core funders: Netherlands, Germany, Norway, and Switzerland
- Co-funded projects: with USAID, SDC, IKEA Foundation

Source: UOMA interviews & consultations, supplemented by 11. GIZ, Energizing Development (EnDev) - programme for energy access, 2005 [Link]
Many development partners have partnered on initiatives to further accelerate progress towards shared access goals (2/9)

Program: GET.invest

Overview

• Target action: Support government of Uganda to develop conducive frameworks for off-grid renewable energy access
• Support MEMD on Long Term energy planning and scenario modelling
• Project status: Ongoing
• Target industry:

Approach

• Support ERA in the development of a tariff and subsidy framework for mini-grids
• Support ERA in the development of Isolated Grid Standards
• Support MEMD in development of an Electricity Access Data Management System
• support MEMD on Uganda energy Sector planning gaps

Impact to date

• The final draft report of Tariff study submitted and approved by ERA
• All drafts for the IGS standards have been completed and submitted to ERA
• Soon finalizing the structure for the Electricity Access Data Management System
• Starting on the diagnostic to assess Uganda sector energy planning requirements

Affiliated organizations

Implementers:
GIZ, ERA, MEMD, UETCL

Funders:
EU, Germany, Sweden, Netherlands, Austria

Source: UOMA interviews & consultations, supplemented by 1.GET.invest, About GET.invest, 2019 [link]
Many development partners have partnered on initiatives to further accelerate progress towards shared access goals (3/9)

**Program:** Support Uganda Solar Energy Association

### Overview

- **Target action:** Promote industry-led market development for off-grid
  - Supporting USEA to have proper governance and management structure,
  - Empower USEA to deliver services to its member services such as provision of BDS services, sales data collection to ascertain number of solar system sold and big data customer research
- **Project status:** Ongoing
- **Target industry:**

  ![SHS](image1) ![On-grid](image2) ![Mini-grids](image3)

### Approach

- Develop annual work plan and strategy plan
- Recruit and train three full time secretariat staff
- Develop toolkit on building strong associations

### Impact to date

- Developed handbook for solar taxation & Implemented awareness campaigns in Eastern and West Nile
- Trained 40 technicians on installation and troubleshooting solar systems & launched business diagnostic for BDS support
- Provided financial & human resource support to help USEA develop the 2018 sales data report

### Affiliated organizations

**Implementers:**
- UNCDF, GIZ

**Funders:**
- Energy Africa, DFID

---

Source: UOMA interviews & consultations supplemented by 1. USEA, USEA handbook on solar taxation - UNCDF, 2019 (link)
Many development partners have partnered on initiatives to further accelerate progress towards shared access goals (4/9)

**Program:** Energy and Environment Partnership/ Southern and East Africa

**Overview**

- **Target action:** Accelerate the growth of a dynamic, commercial off-grid energy market to provide clean, modern, and affordable energy access to 20M of households and businesses beyond the grid in sub-Saharan Africa
- **Project status:** Ongoing
- **Target industry:**
  - SHS
  - Mini-grids

**Approach**

- Platform for leading donors and investors to incentivize technological innovation, fund early-stage companies, and support critical elements of the off-grid ecosystem

**Impact to date**

- 50+ companies & market enablers supported across 18 countries in sub-Saharan Africa
- 3.75M expected connections reaching over 15M people in SSA
- $435M in private investment catalyzed

**Affiliated organizations**

**Implementers:**
- USAID

**Funders:**
- USAID / Power Africa, DFID / Energy Africa, Shell Foundation

Source: UOMA interviews & consultations, supplemented by
1. GOGLA, USAID Scaling Off-Grid Challenge for Development (SOGE), 2018,
2. Scaling Off-Grid, Interactive year-in-review, 2018
Many development partners have partnered on initiatives to further accelerate progress towards shared access goals (5/9)

**Program:** Energy and Environment Partnership/ Southern and East Africa

**Objectives:**
- **Target action:** Contribute to reduction poverty by promoting inclusive and job-creating green economies, and by improving energy security in the Southern and East Africa regions while mitigating global climate change
- **Project status:** Ongoing
- **Target industry:**
  - SHS
  - Mini-grids
  - Cook stoves

**Overview**

**Approach**
- Funding projects in all fields of renewable energy and energy efficiency, bridging the gap between a good idea and a bankable project
- Projects are selected through two funding windows from early stage to market ready projects, including last mile feasibility studies, pilots, demonstrations, commercial scale-ups, replication and rejuvenating projects

**Impact to date**
- Providing sustainable energy and agro hubs in Kamwenge district, clean energy for the Ugandan dairy industry, biogas for milk cooling & sustainable energy services for Kitobo island
- Had 15 grant funding calls for innovative programs and businesses since 2010
- Invested US$ 85.9M in renewable energy ventures, impacted 5.1M people with enhanced energy access & created 8.2K jobs across 15 countries

**Affiliated organizations**
- Implementers: KPMG Finland
- Funders: Ministry of Foreign Affairs of Finland, DFID and The Austrian Development Agency

**Industry stakeholders**
- Private sector operators
- NGOs
- Financiers
- Government
- Dev partners
- Associations
- Other stakeholders

Source: UOMA interviews & consultations, supplemented by
1. GOGLA, USAID Scaling Off-Grid Challenge for Development (SOGE), 2018,
2. Scaling Off-Grid, Interactive year-in-review, 2018
Many development partners have partnered on initiatives to further accelerate progress towards shared access goals (6/9)

Program: New Deal on Energy for Africa

Overview

- Target action: Increasing on-grid generation & transmission to add 160 GW of new capacity & create 130M new connections
- Increasing off-grid generation to add 75M
- Increasing access to clean cooking energy for ~130M households
- Project status: Ongoing
- End date: 2025
- Target industry:

Approach

- Mobilizing domestic and international capital for innovative financing in Africa's Energy sector
- Supporting African countries in strengthening energy policy, regulation and sector governance

Impact to date

- Approval of 29 energy sector operations worth USD 1.7 billion to deliver:
  - 546 MW of additional installed capacity of which 526 MW are from renewable energy sources & 21,264 km of distribution lines
  - 641 km of transmission lines, substations & 7,800 public lighting units
  - 688,950 new households/businesses receiving electricity access

Affiliated organizations

Implementers:
- AfDB

Funders:
- AfDB, Africa Energy Leaders Group, Sustainable Energy Fund for Africa, SE4ALL, UK's Energy Africa Campaign and Power Africa

Source: UOMA interviews & consultations

Private sector operators  NGOs  Financiers  Government  Dev partners  Associations  Other stakeholders
Many development partners have partnered on initiatives to further accelerate progress towards shared access goals (7/9)

**Program:** Facility for Energy Inclusion¹,²,³

**Overview**

- **Target action:** Providing consumer and corporate financing solutions to solar off-grid companies in the related ecosystem (OGEF)
  - Offering flexible project and corporate finance solutions to rural electrification projects of less than 25 MW and mini-grids (on-grid)
- **Project status:** Ongoing
- **End date:** 2025
- **Target industry:**
  - SHS
  - Mini-grids
  - On-grid

**Approach**

- Operate with a clear mandate to maintain focus on underserved markets & encourage innovative transactions that create long term market value for investments
- Provide flexible capital on commercial basis, including local currency & have management set up across Africa to maximize local engagement & understanding

**Impact to date**

- Reached its final equity close with US$ 59M in committed equity capital & US$ 36M in debt facilities to support off-grid energy access
- Raised US$ 160M targeted towards financing rural electrification and mini-grid development projects

**Affiliated organizations**

**Implementers:**
- LHGP & Fieldstone

**Funders:**
- African Development Bank, UKaid, USAID, Shell Foundation, Nordic Development Fund, Global Investment Facility, All On, Calvert Impact Capital, DFID
Many development partners have partnered on initiatives to further accelerate progress towards shared access goals (8/9)

Program: Smart Communities Coalition

Overview

- **Target action:** Increasing efficiency in refugee camp management & service delivery
  - Empowering refugees to provide for themselves and their families
  - Addressing the needs of community members in and around refugee settlements
- **Project status:** Ongoing
- **End date:** N/A
- **Target industry:**
  - SHS
  - Mini-grids
  - On-grid

Approach

- Employ an ecosystem approach to technology deployment:
  - Identify opportunities by engaging stakeholders on ground & establish working groups
  - Encourage exchange of ideas across groups & implement pilot projects
  - Monitor & evaluate progress

Impact to date

- Created market profiles highlighting the latest data in purchasing power, refugee skillsets, energy & mobile access in target settlements
- Hired expert staff in Nairobi and Kampala to lead stakeholder engagement, facilitate pilot implementation and reinforce capacity to drive results
- Awarded US$ 465K in grants to 3 companies to increase energy access in refugee settlements in Uganda

Affiliated organizations

**Chairs:**
Mastercard & USAID/Power Africa

**Members:**

Source:
1. U.S Embassy, *Power Africa announces grant winners to improve electricity access in refugee settlements in Uganda refugee settlements*, 2019
2. UNHCR, *Smart Communities Coalition*, 2018
3. Mastercard, *Smart Communities Coalition - Year in review*, 2018
Many development partners have partnered on initiatives to further accelerate progress towards shared access goals (9/9)

**Program:** Utilities 2.0

**Overview**

- **Target action:** Seeks to combine centralized and decentralized technology (including solar home systems, mini-grids, grid, & smart grid systems) into an integrated, intelligent, & interactive energy network that can deliver customer-centric, clean energy solutions to end energy poverty at the lowest cost, in the fastest time
- **Project status:** Ongoing
- **End date:** N/A
- **Target industry:**

<table>
<thead>
<tr>
<th>SHS</th>
<th>Mini-grids</th>
<th>On-grid</th>
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**Approach**

- To illustrate how the comparative advantages of centralized and decentralized energy can create a robust, integrated energy system for grid and non-grid customers alike
- Leverage digitization and data analytics to integrate DRE technologies so that utilities can have new alternatives to grid extension, faulty transformers, and unprofitable connections

**Impact to date**

- Particularly in Uganda, Utilities 2.0 launched the “Twaake” pilot with UMEME, Makerere University, The Rockefeller Foundation & Power for All
- Constructed the first fully integrated mini-grid in Uganda in partnership with UMEME, PowerforAll and Engie Energy Access

**Affiliated organizations**

**Funder:**

- The Rockefeller Foundation

**Members:**

- Power for all, Shell Foundation, AMDA, ENGIE, PowerGen, Rensource, Fenix, East African Power (EAP), UMEME, Equatorial Power, EnerGrow, ZOLA Electric and others

Source: 1. Power For All, Utilities 2.0: Integrated Energy for Optimal Impact, 2019
Associations represent private sector interests, advocate policy issues to government

Uganda National Renewable Energy and Energy Efficiency Alliance is an umbrella body whose aim is to avail a platform that consolidates Uganda energy sector leadership

<table>
<thead>
<tr>
<th>Associations</th>
<th>Mandate &amp; description</th>
<th>Membership &amp; capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>USEA</td>
<td>Seeks countrywide mobilization of solar providers, coordinating stakeholders, playing an advocacy role and capacity building</td>
<td>&gt;100 members consisting of engineers running local businesses and solar product distributors; receives targeted support from dev partners like RECP, DFID, UNCDF &amp; PSFU</td>
</tr>
<tr>
<td>BEETA</td>
<td>Promotes biomass energy efficient technologies through networking, sharing information, and developing knowledge among member organizations / individuals</td>
<td>50 member companies involved in production of biomass efficient technologies, such as briquettes &amp; stoves, &amp; institutions involved in research and development of biomass energy</td>
</tr>
<tr>
<td>HPAU</td>
<td>Champions hydropower development in the hydropower sub-sector through advocacy, capacity devt &amp; resource mobilization</td>
<td>Membership open to private sector companies, organizations &amp; associations, consumers, &amp; policy makers; receives support from GIZ, CREEC, &amp; WWF</td>
</tr>
<tr>
<td>EEAU</td>
<td>Aims to foster provision for quality energy efficiency services, enhancing research, innovation &amp; knowledge transfer</td>
<td>Large capacity of technical members working to get association accreditation to certify Energy Efficiency Professionals in the country</td>
</tr>
<tr>
<td>UNBA</td>
<td>Seeks to unite and support stakeholders as well as existing regional associations in the biogas sector</td>
<td>National umbrella organization of the UG biogas sector; four associations organized according to regions, supported by partnership with GIZ</td>
</tr>
<tr>
<td>WPAU</td>
<td>Promotes uptake of wind power technology through uniting stakeholders, playing an advocacy role and capacity building</td>
<td>&gt;10 private sector companies involved in various aspects of wind power technology</td>
</tr>
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Associations represent private sector interests, advocate policy issues to government

**Organization**

**Work in Uganda**

- UNREEEA is an NGO for profit incorporated 2014 as result of the private sector players in the various renewable energy and energy efficiency sub-sectors signing a memorandum of understanding to come under one umbrella body. The primary role of the Uganda National Renewable Energy and Energy Efficiency Alliance (UNREEEA) is to avail a platform for consolidating the renewable energy and energy efficiency private sector wing as well as improving its business environment.


- The alliance aims to among other objectives:
  - Identify and disseminate best practices related to market development for renewable energy and energy technologies in Uganda.
  - Establish permanent working relationships with government institutions, civil societies as well as other sector stake-holders in the energy sector.
  - Initiate and upgrade a strong private sector led approach in the development of the renewable energy sub-sector in Uganda.
Associations represent private sector interests, advocate policy issues to government

**Organization**

**Work in Uganda**

- Uganda Solar Energy Association was formed by companies operating in the solar sector with support from the Private Sector Foundation Uganda and had 120 members by end of January 2019.
- The aim of USEA is to facilitate business growth and promote self-regulation and aimed at spurring off-grid solar industry-led advocacy and coordination to support universal energy access.

To further its’ objective, USEA has partnered with the following organizations:

- **USAID’s Power Africa Uganda Electricity Supply Accelerator** – supporting USEA in solar market development, public awareness and promotion, creating linkages through the supply chain, business development and capacity and monitoring and evaluation.
- **UNCDF/DFID** – market sales data collection in collaboration in with GOGLA & Dalberg data insights to run a data collection pilot for the sector, business development services, media and PR campaign to increase visibility and reach and tax advisory services in conjunction with URA & government to develop a tax handbook.
- **PSFU/WORLD BANK** - Through the World Bank Energy for Rural Electrification project (implemented by PSFU), USEA has obtained support in setting up the secretariat infrastructure, hiring staff and providing HR & Finance Expertise as well as TA in business strategy and financing models to adopt for an association.
There are a number of research institutions and consultants active in UG working to support the market (1/4)

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| PRIVATE SECTOR FOUNDATION UGANDA | • Created to enhance private sector competitiveness by providing capacity through policy advocacy and enhanced business development services  
• Also play a key role in implementing some government and donor projects  
• Currently implementing technical capacity aspects of the Energy for Rural Transformation phase III such as empowering USEA |
| CREEC | • Focuses on the thematic areas of rural electrification, energy for productive use, household energy and energy entrepreneurship  
• Has two departments: testing services for product development & independent testing of cookstoves & solar, and project engineering for project implementation and consultancy |
| REBi | • Implemented by the Department of Electrical and Computer Engineering at Makerere University in close cooperation with The Royal Norwegian Society for Development (Norges Vel). The incubator was initially funded by Nordic Climate Facility (NCF) and now funded by NORAD  
• Main focus is on entrepreneurship, improved co-operation with SMEs and technology transfer from countries outside Uganda which are all innovative project activities which makes the project idea a unique and sustainable option for development |

Source: UOMA interviews & consultations, supplemented by  
1. REBi, About REBi, 2020  
2. PSFU, About PSFU, 2019
There are a number of research institutions and consultants active in UG working to support the market (2/4)

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| Global Green Growth Institute | • Signed five-year working relationship with GoU to foster green economic growth implementing a planning framework with three outcomes:  
  • Mobilize financing for implementation of green growth strategy  
  • Support improved planning of secondary cities to catalyze green growth & urbanization  
  • Support govt efforts to expand electricity investing in renewable energy  
| NRECA International | • Partnered with REA to define the country’s electrification strategy through the Uganda Accelerated Rural Electrification Program. Funded by the World Bank, developed a master electrification plan for one new electric service territory in Uganda  
  • Today, the team is on a path to lay the groundwork to produce master plans for all 13 of the country’s electric service territories funded by the USAID/Power Africa  
| ENERGY4IMPACT | • Supports businesses serving off-grid communities with a range of services form business development services, access to finance and project development for innovative models  
  • Supporting the implementation of a number of initiatives such as the Off-grid Refrigeration Challenge and Transforming Energy Access programs |
There are a number of research institutions and consultants active in UG working to support the market (3/4)

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| Rocky Mountain Institute | • Engages businesses, communities, institutions, and entrepreneurs to accelerate the adoption of market-based solutions that cost-effectively shift from fossil fuels to efficiency and renewables  
• Supporting the government of Uganda to develop and implement an integrated electrification strategy to drive energy access and economic growth |
| Duke Nicholas Institute | • Research and policy effort that aims to address the challenges around increasing access to modern energy solutions to underserved populations around the world  
• Supporting the development of new, disruptive tools, such as the means to evaluate electricity access through machine learning techniques applied to aerial imagery data |
| Catalyst Off Grid Advisors | • Support businesses, investors, development partners & governments globally to identify appropriate, impactful ways to support off-grid energy access  
• Commissioned by the Rockefeller Foundation and Shell Foundation to develop a predictive model and report highlighting the critical climate finance opportunity that distributed renewable energy (DRE) can provide for unlocking both energy access and inclusive economic development in Uganda among several other African countries |

Source: UOMA interviews & consultations, supplemented by 1. RMI; About RMI 2020, 2. Catalyst; About Catalyst 2020,
There are a number of research institutions and consultants active in UG working to support the market (4/4)

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<td>The E4D Network is run by the Sustainable Energy Research Group (SERG) at the University of Southampton.</td>
<td></td>
</tr>
<tr>
<td>It's aim is to enable a step-change in collaborative research and project development addressing the energy needs of rural communities in developing countries</td>
<td></td>
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<tr>
<td>In Uganda, it has installed (2) mini-grids with a capacity of 13.5 kW</td>
<td></td>
</tr>
<tr>
<td>The Alliance for Rural Electrification (ARE) is an international business association that promotes a sustainable renewable energy industry for the 21st century, activating markets for affordable energy services, and creating local jobs and inclusive economies.</td>
<td></td>
</tr>
<tr>
<td>They accept members from Uganda who enjoy the benefits of advice and advocacy, knowledge and intelligence, business promotion &amp; marketing &amp; business creation and support</td>
<td></td>
</tr>
<tr>
<td>Research sustainable e-waste management and next generation battery technology, with the purpose to promote critical industry advocacy and build a body of evidence to inform responsible corporate waste management programs and policies around end-of-life disposal, recycling, and repair of solar home systems.</td>
<td></td>
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Global and regional networks and associations are also enabling private sector players to leverage support services (1/2)

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| GOGLA        | • GOGLA represents over 100 global members as a neutral, independent, not-for-profit industry association. Its mission is to help its members build sustainable markets, delivering quality, affordable products and services to as many households, businesses and communities as possible across the developing world  
• Their key focus areas on access to finance working on standardizing reporting metrics for PAYG, creating a conducive enabling environment by working in advocacy around key issues like tax and on socio-economic research & insights for the market more broadly  
• Published semi-annual market database for data collection in PAYG in Uganda |
| Sendea        | • Sendea "solar entrepreneur network for decentralized energy access" is a capacity development platform for solar entrepreneurs to build their solar company and let it grow  
• Their key focus is providing support to a cohort of early stage local companies with finance, technical assistance and long-term coaching and mentorship to nurture these companies and help them grow  
• In Uganda, will be carrying out business skills training, supporting productive use elements like solar irrigation and SME use and looking at the case for PV back up systems in institutions like schools and health centers |

Source: UOMA interviews & consultations, supplemented by
1. GOGLA,  GOGLA home page, 2020, 2.SENDEA, SENDEA home page, 2020,
Global and regional networks and associations are also enabling private sector players to leverage support services (2/2)

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<tr>
<td>AMDA</td>
<td>• Collaborating with industry, policy-makers, government authorities, donors, and other stakeholders to advocate for optimal policies and efficient capital deployment that will benefit the mini-grid sector and the people it serves</td>
</tr>
<tr>
<td></td>
<td>• Serving as the voice of the mini-grid development industry in Africa to promote the growth and sustainable development of the mini-grid sector and act as a unified focal point for stakeholders to engage the sector</td>
</tr>
<tr>
<td></td>
<td>• Provide a platform that enables transparency in industry performance through comprehensive market data and analytics in order to establish, evaluate and promote key financial, business and policy solutions to overcoming the major barriers to growth for the sector</td>
</tr>
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</table>

| **Open Capital** | **Over the past 10 years, Open Capital has had 1,000+ engagements for businesses, investors, development organizations, and government across 25+ countries raising >USD 1 billion in capital** |
|                 | • In the off-grid energy space in Uganda, Open Capital has completed ~50+ engagements for private sector, development partners, and investors, supporting many of the large solar home system businesses with strategy and operations |
|                 | • Completed strategy and growth engagements with off-grid energy distributors & PAYG operators, has close relationships with >12 mini-grid companies and continues to support the ecosystem through tailored support for commercial banks to accelerate local currency funding or operators & developers |

Source: UOMA interviews & consultations, supplemented by https://www.africamda.org
Do contact us if you have any feedback or interest in partnering:

contact@uoma.ug
https://uoma.ug/