

Agribusiness & Rural Enterprise Development

TO STRENGTHEN
MINI GRID MODELS



FALL 2020

Photo courtesy of the GMG Facility Kenya

Agriculture and access to energy are both solutions that have been attributed to reducing poverty, particularly in rural areas. Every development finance institution from the governments of the UK, USA, Germany, France to a number of leading private foundations including Rockefeller Foundation, Ikea Foundation and more have invested heavily into strengthening both agriculture and off-grid energy sectors.

However, upon exploring opportunities to strengthen the off-grid mini grid sector in East Africa, it is apparent that agricultural and off-grid energy sector initiatives have had limited overlap and collaboration that could result in mutual wins in building sustainable business models that stimulate meaningful socio-economic benefits to

rural communities. This case explores the ongoing challenges faced in finding alignment and partnerships, then examples of models that should receive more attention and resources to realize common impact and development goals.

Common Pain Points to Address for Greater Alignment and Impact

Building off-grid energy solutions and agribusinesses connected to buyer markets is no easy task. Below are common issues and points of misalignment that have resulted from several factors, but most notably, differing underlying drivers and metrics for success. These metrics are often established early on by founding teams or management, but also by development institutions that tie early project funding to metrics that can cause conflict with other sectors later on. It would be in the interest of different development institutions to have their energy, agriculture, rural livelihoods and climate teams meet and collaborate on potential opportunities for greater catalytic programming.



Photo courtesy of WeConnex

Key Points that Cause Ongoing Misalignment

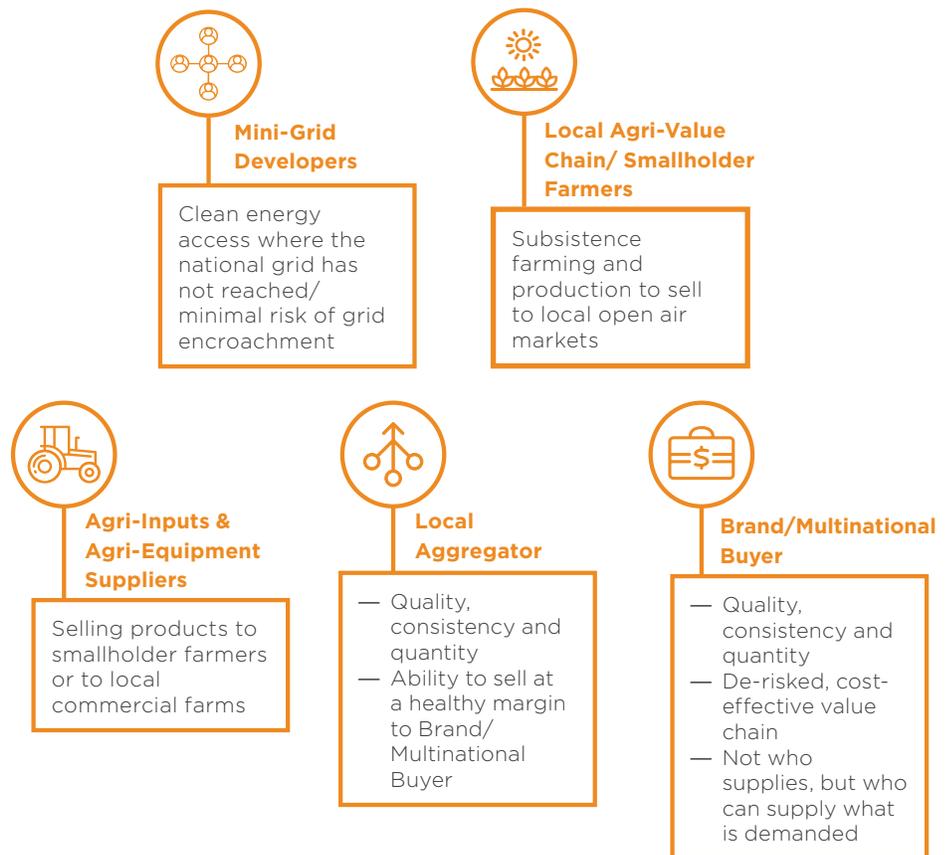
- **Geography.** Mini grids are often located in hard-to-reach areas with poor roads, long distances to major trade hubs and underdeveloped markets. They go to the last mile because the government struggles to go there, and it often reduces risk of grid encroachment while increasing access to development financing. While not all mini grids are in remote locations, and even neighbor upon high potential agricultural areas, sites are located among lower-income populations with relatively low willingness and ability to pay for electricity and productive use or higher cost appliances. As such, mini grid developers (MGDs) are expected to provide energy and stimulate a local underdeveloped economy to drive up consumer demand and ability to pay for energy.
- **Lack of Focus on Increasing the Socio-Economic Pie Based on Market Dynamics.** . AMDA's Mini Grid Benchmarking 2020 Report cites Crossboundary Labs' early findings that tariff reductions lead to an increase in utilization rates, while ARPU (Average Revenue per User- for mini grids) is uncorrelated to increased energy demand or utilization. This implies that users have a limited overall need for greater energy use and that price of energy is a large influencer of consumption. Crossboundary also found that higher cost productive appliances sold at significantly lower rates than the lower cost radios and household appliances, yet there is weak evidence that sale of TVs and radios changes the energy demand or economic position of households. While more data is needed, this suggests that mini-grid communities are often still not being exposed to more catalytic opportunities to raise their household income, increase community-level socio-economics or enter activities that are financially lucrative enough to warrant greater usage of energy. With the exception of a few MGDs, many developers and pilots are focused on stimulating local productive use of energy that translates into users selling products and services back to the local community. There has been less focus among funders, developers or equipment suppliers on regional, national or even international market dynamics, and how to build broader market access to these 'larger pies' of wealth for the mini grid communities. This is much more complex, requiring investing in the training, logistics and inputs to boost users to produce the quality, quantity and consistency of products demanded by larger buyers in the market . Yet, there are opportunities for mini-grid communities to engage in regional and international value chains and

to play a role in increasing food security, by shifting the balance of local production away from net import products- products that are already produced in a country such as Kenya, yet have higher volumes of imports from China, Uganda, Tanzania or the Middle East.

- **Poor National Infrastructure..** Poor or insecure roads to mini-grid communities drives up the cost of trucking and fuel, security or loss of goods, and make last mile trade points less attractive. This poor infrastructure also drives up the cost of constructing and operating mini grids and any equipment to these communities.
- **Constant Cash Flow Constraints & Limited Access to Capital.** Combine the higher cost of doing business and reaching these remote points with a low-income population and low-margin agri-equipment suppliers and we can see the levels of complexity in building a financially-sustainable model! A range of impact investors to smaller microfinance institutions and SACCOs provide some access to much-needed debt, but this is not enough and larger pools of low-interest capital comes with a lot of restrictions. For example, Root Capital will only lend to aggregators and local value chains of a larger size that have existing contracts with national and multinational buyers. In Kenya, Root Capital also only focuses on 2 sectors, and while looking to expand, must constantly weigh the demand for their financing from large partners, as well as changing regulatory policies and political dynamics that are restrictive to certain agricultural sectors.

Shortlist of Cross-Sector Drivers that Can Create Misalignment or Opportunity

Actors who could coordinate for mutual benefit are often pulled in different directions, making alignment challenging



Further arise issues relate to:

- Geography & Logistics
- Access to Finance
- Seasonality and Cash Cycles
- Market Access & Ease of Doing Business
- Financial Margins & Unit Economics

These issues are discussed in greater detail in the appendix.

Innovative Agricultural Models to Unlock Potential in Mini Grid Communities



Photo of WeConnex NEMACO fishing operations

Beyond alignment, other factors to consider in designing an effective model were outlined by EEP Africa. Their focus was on 3 business models in their portfolio by which MGDs integrate PUE activities: 1) the Energy Supply Model, in which the mini-grid developer produces and supply electricity, 2) the Business Acceleration Model, in which the mini-grid developer also provide appliance and loans, and 3) the Supplier-Offtaker Model, in which a minigrid developer operates agricultural activities as the main electricity offtaker. An effective model is characterized by 1) a direct increase in project IRR, 2) indirect financial benefits brought to mini-grid customers, and 3) social benefits such as better health for the community at large.

Innovative Agricultural Models to Unlock Potential in Mini Grid Communities

There are too few models for success that link mini grids and successful agricultural value chains, and many of these examples are still nascent, taking years to pilot and build up. Every MGD struggles to identify the right productive use strategy to drive up energy demand plus stimulate local wealth to drive affordability and demand for greater energy use. This

appears partly the result of different funding initiatives that each sector relies on (e.g. agriculture vs. energy) and yet that do not incentivize or prioritize the mutual and greater wins that could result from joint off-grid energy, agricultural development.

The case features several models relevant to the mini grid sector, and among willing and interested collaboration partners. Several mini grid companies have pioneered and made progress in building PUE and

value-chain linked models, including Powerhive, Powergen, Sunkofa and RVE.Sol. These and other new developers are increasingly focused on how to build diversified revenues and energy demand growth into their DNA from design phase. As such, the focus below includes examples that may be unfamiliar to MGDs and the energy access sector, yet pose unique and high potential opportunities for future win-wins.



Photo courtesy of Jumeme

JUMEME

A Joint-Venture for Success

JUMEME is a joint venture between experienced implementing partners and the European Union. Jumeme is unique in that its last 4 years of pilots have led to a diversity of PUE business lines, including maize milling and tilapia aggregation, chilling and sales to Dar es Salaam. This diversified strategy and timing makes it a strong unique example of the resilience that this diversified revenue created as Tanzania's mini grid regulatory landscape was faced with new challenges in 2019/2020 that mandated lower, standard tariffs on par with the national grid and despite the higher costs of offering mini grid power.

The Facts

- Joint venture between RP Global, INENSUS Germany, TerraProjects Austria and St. Augustine University of Tanzania; each partner bringing complementary expertise in finance, mini grid, PUE, project management, local politics/research
- 'KeyMaker model' focuses on embedding mini grids into the local community and designing effective models for development of natural resources and value chains appropriate to the site in collaboration with community

- Heavy focus on local employment, including of engineers, and developing anchor customers from telecom towers and small businesses
- "Energy-Aqua Culture Nexus KMM Project," Phase 1 project on the islands of Lake Victoria focuses on import substitution of tilapia, a 400,000 ton annual deficit with over 50% imports from China. Local fisherman supply fish that JUMEME freezes on-site using mini-grid electricity. JUMEME manages logistics and transportation to Dar Es Salaam, where higher market prices can be reached. Because of import substitution, the community does not perceive JUMEME as a threat but a new market maker.
- Phase 1 results (2019): 12 mini grid sites on the islands, generating over TzS 72M (euro 30,000) additional cash injection into the village economy per year with purchase from over 50 local farmers, 100+ jobs created for collectors and other workers. 2019 Expansion phase into Lake Tanganyika, plus introduction of tilapia fish farming in cages, with local employees contracted to manage
- As of October 2020: 23 active mini-grids, connecting 10,000 customers, and over 150,000 individual beneficiaries
- Maize milling for local sale and fish feed production (future plan) also established- JUMEME provided in-house loans to 15 milling entrepreneurs. Only 7 mills generate more energy demand than 250 households without PUE!
- Mini-grids are tailored to provide power to milling operations and re-established local water treatment- in collaboration with local investors who funded refurbishment of dated water infrastructure with JUMEME power for pumping
- Free electricity to the 10 healthcare facilities that are connected to the mini-grids; 9 new sites planned

— The Opportunity

- Replication of model into other geographies

The Risks & Challenges

- Regulatory delays and policy in Tanzania
- Recent government interference on tariff setting is making electricity business itself challenging which increases the need for revenue diversification

Farm Concern International

Commercial Village Model

Farm Concern International (FCI) has focused on agricultural value chain and local business creation at the village level, developing 'Commercial Villages' (CVs) that act as units of trade and aggregation. FCI's model leverages the village community dynamics and horizontal social pressures to ensure an equitable and collaborative business structure. The legal entity may be a Community-Based Organization (CBO), Help Self Help Group, company or cooperative, depending on the most appropriate model given stage and local dynamics. In Kenya, the cooperative model has often been taken advantage of, resulting in legal loopholes, corruption and issues with transparency. Energy access is not integral to the existing CV model; however, one CV owns and operates a mini-grid that has led to local improvements to health and education systems, while energy is also supplied to its neighbors in Makeni County. Core to the CV model are the following:

1. Market Mapping focused on Demand

Side Analysis & Trends: Understanding market trends and products smallholders could effectively produce to meet market

2. Incorporation/Operating Structure:

Inclusive of all community members in sub-committees with checks and balances

3. Financial Transparency:

Funds and cash flows of the CV are managed with FCI support

4. Technical Support:

FCI provides targeted agricultural extension and productivity support

5. Legal Counsel:

FCI provides legal structuring

6. Focus on Diversified Production, Diversified Cash Flow Cycles:

FCI advises on a strategy of varied crops and harvest cycles with consideration for de-risking against changing demand and crop-specific vulnerabilities

7. Active Market Linkages: Introduction to traders, aggregators and brands that will buy, yet emphasis on avoiding over-dependence on one buying partner

8. Growth Support: Phased legal, operational and production support to ensure CVs are sustainable hubs of opportunity for the community

9. Access to Finance: Savings and credit benefits offered by the CV, and in partnership with SACCOs, MFIs, plus benefits such as school fee loans for community members

The Facts

- An agri-market development agency, focused on the intersection of market analysis and agronomy to ensure smallholders and local communities effectively link with buyer markets; operating in 25 countries with 23 offices
- Over 18 million smallholder farmers and agri-pastoralists impacted
- Successfully linked local rural villages producing African Leafy Greens (ALG) to Uchumi, bringing together individual smallholders to produce the volume required due to Uchumi's central purchasing model
- Tangakona Commercial Village (Western Kenya): High quality cassava and sweet potato vine production was established to then generate revenue from 1) sale of plant vines to One Acre Fund to local farmers in surrounding counties, focused on improved varieties and introduction of good agronomic practices, and 2) sale of cassava chips to Edom Nutrition Solutions, a Kenya-based fortified flour and enriched porridge producer with Sub-Saharan Africa regional focus. While project does not require energy, it boosts local household income and household ability to pay for value addition.

- FCI is implementing AGRA projects across East Africa, including Tanzania, Uganda and Kenya

The Opportunity

- Build CVs at mini-grid sites to drive up household income
- Work with FCI to promote greater value-addition e.g. processing, drying and finishing of raw agricultural production to unlock greater community wealth and PUE benefits
- Introduce mini-grids as a solution for CV sites, in particular for local value-addition or energy-driven production
- Cold chain opportunities may also be relevant, though much more in the case of export-focused crops or goods, while FCI typically focuses on net import and locally, nationally demanded agricultural products more familiar to smallholder farmers

Risks & Challenges

- Mini grid energy as well as other off-grid energy solutions and appliances are expensive to rural farmers, even with consumer financing available; greater success could be achieved with subsidized or lower tariffs
- Agri-sector and FCI funders have not focused on off-grid energy, thus not a core consideration in project design yet
- Grant funding cycles tend to be too short to realize full sustainability of CV agribusinesses and PUE initiatives developed; More funding required for a 5-year time horizon vs. the 3-year (or less) terms

WeConnex

Nexus Center Model for Near-Term Profitability

In under 2 years of operations, few agribusiness models achieve profitability. Enter WeConnex, a Swiss-based startup, focused on building organized value chains, aggregation and linkages to large urban markets by leveraging existing small scale production. WeConnex has launched local entities in Madagascar, Zimbabwe and Nepal. Their focus on strong operations, paired with strong local leadership and a social partnership from the start are critical to success. The core value proposition is offering improved basic services (internet, water, energy) paired alongside income-boosting local value chains.

The Facts

- WeConnex has focused on becoming an expert supply chain developer with local communities by 1) hiring the best local talent/100% local team, 2) leveraging previous ecosystem/ value chain priming of NGO/ development partners to then build formalized value chains and business infrastructure, 3) creating a holding company model that leverages the geographic and other preferences of various investors and funders, while diversifying financial and operational risk across entities and geographies.
- Swiss parent company invests in local project companies; local companies are 50% community owned
- Depends on European and other foreign funders into the Swiss parent. Option to change this type of funding to Result Based Funding (RBF) Schemes, e.g. paying for impact.

- Madagascar company, NEMACO, projects financial breakeven at Year End 2020, 1.5 years after its launch. NEMACO is a social enterprise with 100% local management, zero corruption tolerance, and largely women staff. Built upon a WWF water project to create financial sustainability that also addressed access to affordable basic services. WeConnex Switzerland invested in the purchase/installation of ice making machinery, working capital to purchase fish from fishermen, and trucking/logistics to open air markets in major cities. Focus on connecting ~45 hubs of fishermen along the coast.

Opportunities

- WeConnex has developed a cross-subsidy business model, built upon local agri-business, to offer a suite of improved basic services to local low-income communities. The model can be multiplied in farming and forestry environments in various structurally weak regions
- WeConnex and NEMACO would like to partner with off-grid energy providers to provide the expertise in infrastructure design and energy delivery, while also becoming an anchor off taker of supplied capacity
- NEMACO currently sells its fish to open air markets in the larger cities, yet could earn higher prices and volume sales is targeting businesses, brands as well
- WeConnex is now exploring a new model that leverages knowledge capture and various levels of expertise and support with key strategic partners, including agri-distributors, to create economies of scale in replication. This NEXUS EcoSystem model focuses on production of 'orphan crops' (and

their seeds), essentially traditional varieties generally more adapted to low-input agricultural systems and more tolerant of irregular precipitation, extreme weather events, diseases and pests yet often under-the-radar of international research or commercial breeding programs. It also aims to incorporate creative financing mechanisms, local ownership and other features to build a resilient, highly replicable model.

Challenges & Risks

- European development and impact investment funders on which WeConnex's Swiss entity and many others must depend view the risk of integrated and greenfield business models still high. Over time, many have shied away from capital and resource intensive infrastructure-value chain build-up models, causing cash constraints on these progressive models. The FCDO-funded AgDevCo is an example of a dynamic impact fund that made early investments into build-up value chain models (or greenfield projects), yet is increasingly focused on later stage investments. One such investment in tea production that also included funding for a 1 MW mini grid has been delayed by years due to regulatory setbacks in Tanzania, meanwhile a 5 year period is a general estimate on such projects to achieve financial break-even or profitability.
- Community dependency on one aggregator or market access partner remains a concern for many (and yet a better option than no market access at all)
- Market access and logistics of transportation can be threatened when events such as COVID causes temporary trade route restrictions

Process to Optimize for Agri-Energy Win-Win Models

In developing effective and scalable mini grid-agribusiness models, there are key considerations to include in your analysis and model.

The End Buyer Opportunity?

Knowing the broader market opportunity that communities could be linked to is always a good start. Mapping the market opportunity should always come first with a broad net cast in analysis to map the international, national, regional market dynamics and understand potential products of focus, analyze size, and understand value chain dynamics such as buyer expectations, certificates, requirements, political and regulatory barriers. An individual hire or consultant, as well as NGOs to private consultancies and technical assistance facilities can offer support to conduct demand-focused analysis. Some examples of parties specialized in this include Farm Concern International, Open Capital Advisors, Practical Action Consulting, I-DEV. Any mapping should incorporate analysis of the following.



Local Aggregator: Buy from smallholder farmers then sort them, store them, and sometimes incorporate value-addition such as cleaning, milling, de-pulping, drying. These parties must have sufficient cash to pay farmers. Slow payments is a common reason why many farmers prefer to sell their product directly in the local market, even if they may sell less volume and ultimately earn less income.



Local Retailer or Brand: Any entity that purchases raw, semi-finished or finished goods for final or almost final resale. Examples include local restaurants, hotels, grocery stores and small chains where there are 2–5 local branches that will sell a product within a county or a few counties.



Regional Brand: A company with multiple locations across East Africa. Understanding their purchasing behavior, e.g. whether they have central regional purchasing or central purchasing per country, and their requirements to be considered as a vendor are critical.

Examples: SABMiller, East African Breweries Limited (EABL), Serena Hotels and Resorts, Azam/Bakhresa Group



Multi-National Brand: A multinational brand includes international names but also smaller niche brands that seek smaller volumes of goods and specialty products. These companies typically have very high volume demand, and often high quality and consistency standards. They may be later stage partners for mini grid-related value chains for this reason. However, if requirements for quality, quantity and pricing can be achieved, such a partnership unlocks benefits including technical assistance, working capital and other support. Many of these brands work with impact investors to offer supply chain financing.

Examples: Unilever, Coca Cola, Green Mountain Coffee Roasters, Nestle, Nature's Pride (Netherlands), Olam



National Brand: A national brand is any corporate entity that supplies the country or most of it with a final or semi-final product.

Examples: Uchumi, Naivas, Kenchic, Farmer's Choice, Carrefour, Twiga, Tanga Fresh,



Cold chain produce storage and a woman selling vegetables in a nearby market. Photo courtesy of CLASP.

Local Market Building & Linkage Opportunity?

Beyond realizing the market potential, next is understanding the realities of local context, and the feasibility- including costs and complexity- of building a strong local supplier base that can meet market demand. This includes analyzing needs and developing solutions around:



Smallholder Farmer Technical Assistance:

Agronomic support from selection of crops to pre- and post-harvest optimization that aligns with buyer expectations for quality, quantity, consistency, certifications.

Examples: Farm Africa, Farm Concern International, Root Capital, Partners in Food Solutions.



Appropriate, Affordable Agricultural Inputs:

Farmers often require improved irrigation, seeds, pesticides and farming equipment. A range of large agri-equipment dealers to niche specialists in smallholder farming who may also offer asset financing and micro-loans.

Examples: One Acre Fund (subsistence crops), Apollo Agriculture, iProcure, BrazAfrica, Buhler, SunCulture, Amiran



Financing for Aggregators: Working capital or short-term debt is needed to finance purchase of goods produced by the community; capital is also needed for aggregators, or the MGDs acting as aggregators to purchase goods and possibly inventory for productive use equipment.

Examples: Rabobank, Root Capital, Grassroots Business Fund, OikoCredit



Financing for Smallholder Farmers:

Microfinance loans to purchase agricultural inputs and weather dips in cash flow during agricultural transitions or harvest seasons are almost always needed, and this continues to be a key challenge in building an effective market linkage model.

Examples: Local MFIs, Saccos, Apollo Agriculture, One Acre Fund, Jihudi Kilimo, Musoni, Kiva, Fondem, GRET, Rent-to-Own, Energrow, Kiva

The Opportunity: Scalable Profitable Mini-Grid Partner Models

From a legal and operational standpoint, here are potential structures for energy and agricultural partners to explore and examples.



PowerHive Poultry Rearing

Mini-Grid Developer Group Model

Hypothesis: Mini-grid developers from Powerhive to Jumeme have adapted to the realities of a local underdeveloped market ecosystem where they operate. Current models for Powerhive's KukuPoa program and Jumeme's KeyMaker models demonstrate that the developers stepped in to own and manage key processes critical to stimulating local household income and driving scale of operations required by the market. This model has gained the most traction and seems the most feasible, yet also the most costly and burdensome to the MGD, requiring they invest heavily in building the internal operational capacity and raising the capital to build these tangential value chains.

Examples:

- PowerHive: KukuPoa Poultry, Internet Provider, E-Vehicles
- RVE.Sol: Water Utility
- Equatorial Power: Fish Storage, Processing; Mini industrial park with water purification system (coming soon); Pilot on electric bodas and e-boats
- Rift Valley Energy/AgDevCo: Tea Production with energy supply for processing and community
- VegPro Kenya: Microhydro facility

Benefits:

- (Greater transparency and controls) Centralized management and greater transparency due to single owner of data
- (Customer Relationships Ownership) One company owns client to producer relationships
- (Own Data & Insights) Richer data and insights without delay
- (Easier to Realize Savings) Economies of scale via central management

What this will require:

- (Higher Legal Cost) If more than 1 legal entity created in different jurisdictions (e.g. parent funding entity, and local project entities with some group models, as they scale)
- (Higher Management and Overhead Cost) Professional management with expertise to run each business unit and P&L



Photo of Agsol, a maize mill appliance company that has partnered with Powerhive for PUE

Mini-Grid and Agri-Value Chain Partnership

Hypothesis: This model is the one that most MGDs and solar agricultural productive use companies aspire toward. The hope and belief is that the right last mile distribution and financing partner will manage and operate all functions related to productive use and the agricultural value chain that the MGDs do not want to absorb, nor feel is their core expertise. An effective partnership will reduce risk and financial burden, as well as overall complexity of operations for each party. The main challenge is that it is largely unproven to-date with MGDs struggling to find or align with the right partner that is also locally present and one-stop-shop solution. As a result, more complex partnerships have formed that require more time and patience to optimize.

Examples:

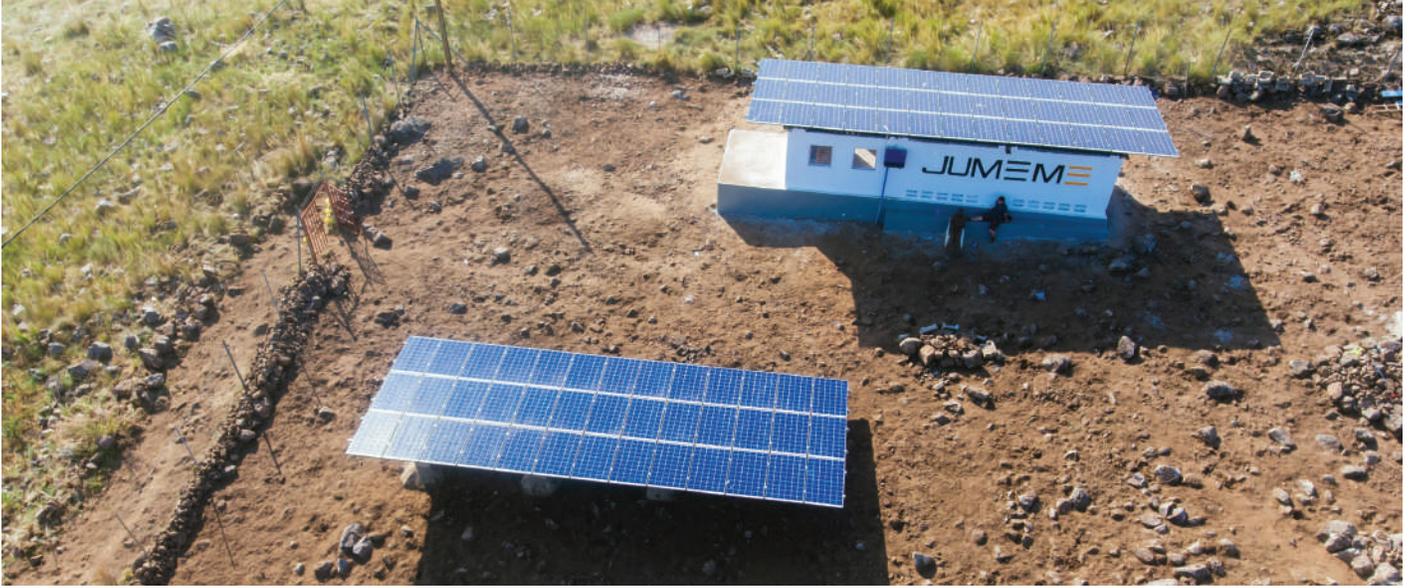
- PowerHive-Agsol: Maize milling using Agsol milling equipment
- Powergen-Unilever: Tea production for plus community energy
- Equatorial Power-ENventure (Uganda): Bulk appliance sourcing and distribution
- (Potential) Farm Concern International- mini grid for agri-production and community energy
- (Potential) WeConnex- mini grid integration to supply fish production and fishing communities

Benefits:

- (Lower Risk) Corporate risk and range of responsibilities are disbursed among partners
- (Lower Management and Overhead Costs) Experts focus on just their areas of expertise vs. adopting or hiring new expertise
- (Broader Pool of Funders) Partners in different sectors can leverage greater pools of diversified funding

What this will require:

- (Planning & Commitment) Strong MOU and partnership agreement outlining partner responsibilities, cost and profit sharing
- (Strong Project Leader) While a whole new team in-house may not be required, a strong project or partnerships lead to facilitate between parties is critical
- (Integrated Knowledge Management & Data Transfer Processes) Effective data sharing and systems integration will facilitate smooth implementation



JUMEME Power House

Mini-Grid and Agri-Value Chain Joint Venture

Hypothesis: De-risk but build in mutual partnership and upside for the MGD and an FMCG or agri-products aggregator, which is formalized in a special purpose vehicle or separate legal entity. In creating this separate legal entity, all partners are legally and financially protected from any future downside. The performance of the joint venture will also not affect any capital raise process to the mini-grid developer or their partner.

Examples:

JUMEME: A consortium of complementary expertise in energy, finance and project management for an aquaculture/mini grid

Benefits:

- (Stronger Partnership) Deeper long-term commitment among partners
- (Attractive Investment) Such an arrangement might attract other corporate and strategic investors
- (De-Risking) Additional legal and financial protections to each partner entity

What this requires:

- (Higher Legal Costs) Beyond a partnership, a new special purpose vehicle (SPV) or legal entity that is jointly owned by the anchor partners who co-own equity into the entity
- (Higher Management and Overhead Costs to Start) In some cases, may result in higher costs of hiring a new dedicated management team; however, cost savings could also be realized if JV partners act as active board members with a leaner internal team

Conclusion

There are great opportunities for mini grids, their communities and agriculture sector players to better align to unlock win-win solutions that also solve for productive use of energy, energy demand management and economic stimulus for local communities. Critical to seeing greater success and alignment is connecting relevant potential partners, and providing the funding from agriculture and off-grid energy investors and funders to realize these paired solutions. Specifically, longer-term patient capital focused on the nexus of energy, agriculture, and rural enterprise development is needed. As up to 5 or even 10 years may be required to build

scalable, sustainable and stable models that address this parallel growth of rural enterprise- mini grid power- local agribusiness, most existing funding falls far short of providing support to a get projects past this critical tipping point for success. Furthermore, while the mini grid and PUE sector continues to advance with new and recent pilots, a greater focus on tapping into larger, more lucrative and diversified value chains will benefit the MGDs and communities they serve. There is also an under-realized opportunity for agribusinesses or brands to serve as the anchor offtaker and anchor business that requires mini grid power to improve its productivity and operations, while

also providing additional energy supply to neighboring communities. Large partners could be offered greater incentives to serve in this function, and move faster to do so as the long timelines and unexpected hurdles faced at the government and public or private sector-partnership agreement stages continue to be a key hurdle to timely progress. Many agri-focused and off-grid energy-focused funders, NGOs and even developers have overlooked and underfunded, this greater solution posing an opportunity for a new facility or impact investor to form that uncovers and develops promising new projects, and then funds or co-invests to realize them.

Appendix. Common Points of Misalignment & Opportunity for Collaboration

The table below summarizes the perspectives of mini grid and agri value chain actors in the hope of developing a better common understanding that will guide better alignment of untapped partnerships and funding.

Key Drivers of Decision-Making by Sector:



Issue	Mini-Grid Community	Local Agri-Value Chain/ Smallholder Farmers	Agri-Inputs & Agri-Equipment Suppliers	Local Aggregator	Brand/Multinational Buyer
Key Underlying Driver	Clean energy access where the national grid has not reached/ minimal risk of grid encroachment	Subsistence farming and production to sell to local open air markets	Selling products to smallholder farmers or to local commercial farms	<ul style="list-style-type: none"> Quality, consistency and quantity Ability to sell at a healthy margin to Brand/Multinational Buyer 	<ul style="list-style-type: none"> Quality, consistency and quantity De-risked, cost-effective value chain Not who supplies, but who can supply what is demanded
Geography & Logistics	Last mile, rural areas with no grid, limited infrastructure	Varies, but the farther from key highways and transport routes, the harder to reach the market and at competitive cost	Suppliers targeting near-term financial sustainability, e.g. cold chain and commercial-grade: Key hubs along high-margin trade routes for export or other high margin products (green beans, avocados, fruits)	Key aggregation hubs along product trade routes, e.g. key roads	<ul style="list-style-type: none"> Capital cities, ports, exporters Seeking partners who can effectively reach these final aggregation and sales points

Agribusiness & Rural Enterprise Development to Strengthen Mini Grid Models

Issue	Mini-Grid Community	Local Agri-Value Chain/ Smallholder Farmers	Agri-Inputs & Agri-Equipment Suppliers	Local Aggregator	Brand/Multinational Buyer
Access to Finance	<ul style="list-style-type: none"> — No cash to invest in entrepreneurship, improved inputs or other opportunity to drive income up — Low income, unbanked with limited to no access to credit — Irregular and extremely low cash flows — Local SACCOs, MFIs are the only option — PAYGO models (home solar, mini grids, last mile distributor/financing models e.g. Energrow) 	<ul style="list-style-type: none"> — No cash to invest in improved inputs, seeds, productive equipment for improved yields, reduced losses or value-addition — Low income, unbanked with limited to no access to credit — Irregular and extremely low cash flows — Local SACCOs, MFIs are the only option — PAYGO models (home solar, mini grids, last mile distributor/financing models e.g. Energrow) 	<ul style="list-style-type: none"> — Inventory financing is a common challenge — Consumer financing is a constant challenge for those seeking to sell to Local Agri-Value Chains; some have turned to leasing models or raised lending facilities to address this 	<p>Working capital or short-term debt constraint limits ability to purchase more from local farmers or pay them in under 30 days; slow payment cycle leads farmers to prefer smaller local sales markets</p>	<ul style="list-style-type: none"> — Can often provide working capital directly or through a third party financing partner, but will only do so for strong, reliable value chain partners who meet quality, quantity and consistency standards — May provide programmatic funding and technical assistance support to build up promising local agri-value chains if a strong, long-term economical case
Seasonality & Cash Cycles	<ul style="list-style-type: none"> — Extremely volatile and consistently low cash and cash flows make future planning or investment difficult concepts and distant opportunities — Often focused on products that can only sell locally to other low-income neighbors or local MSMEs 	<ul style="list-style-type: none"> — If not well planned, focus on seasonal crops will result in volatile and very cyclical cash flows; Better planning and crop rotation, paired with improved inputs such as irrigation and fertilizers could yield more cycles of product and cash — Long wait period for larger buyers-aggregators or brands- to pay 	<ul style="list-style-type: none"> — For leasing models or smaller buyers, seasonality of buyer cash flow cycles can cause repayment issues — Seasonality of target agri-sector activities can also affect sales cycles and thus company cash cycles 	<ul style="list-style-type: none"> — Focused on what the market or buyers demand — Irregular cash flows can be addressed by sourcing of varied crops from a range of local agri-value chain suppliers 	<p>Demand high quality, quantity and consistency of product year-round at cost-effective prices, and the reliable partners to ensure this</p>

Issue	Mini-Grid Community	Local Agri-Value Chain/ Smallholder Farmers	Agri-Inputs & Agri-Equipment Suppliers	Local Aggregator	Brand/Multinational Buyer
Market Access & Ease of Doing Business	Limited to no awareness or consideration for larger market access or market demand at the regional, national or international levels; as such, a focus on local micro-business or subsistence activities	<ul style="list-style-type: none"> — Limited to no awareness or consideration for larger market access, leads to a focus on selling to a local market with limited cash liquidity — Often unaware of the quality, quantity and consistency standards or pricing dynamics of large buyers 	<ul style="list-style-type: none"> — Focus on smallholder farmers requires investment into last mile distribution, consumer education and servicing products in remote locations; focus on low-income buyers means ability and willingness-to-pay a constant challenge — Companies offering innovative solutions such as solar-power or off-grid linked equipment are early stage, underfunded and have high costs of doing business; most rely on grants in their early days to gain traction before investors will invest 	<ul style="list-style-type: none"> — Act as the intermediary between local smallholder farmers and big buyers. Good aggregators will inform their suppliers on improved practices and market dynamics; many aggregators will not provide this transparency or improvement support. — Many product value chains in Kenya in particular are heavily controlled by strong aggregators that control the value chain/ block others 	<ul style="list-style-type: none"> — Regional and national (domestic) brands demand a broad range of products, where cost is important — International brands typically demand higher quality, quantity and consistency of product that meet European or other standards — Focus is typically on finding those reliable suppliers, not on building up rural farmer communities or educating them on market demand
Financial Margins & Unit Economics	Little awareness or consideration for how much money is actually made	<ul style="list-style-type: none"> — Many smallholder farmers make no money on farming — Traditional cooperative models face heavy corruption at the management level 	Slim margins means volume will be critical, as will active follow-up for payments from consumers	Focused on securing a healthy, sustainable margin by negotiating lower costs among smallholder farmers- yet good aggregators offer more consistent access to market and sales for farmers	<ul style="list-style-type: none"> — Driven by a focus on de-risking their value chain from a financial perspective — Seeking quality, quantity and consistency at the lowest cost — Cost and margin are more important than impact, though many buyers will want to ensure fair practices and impact as well — Commercial farms can often offer what big brands need at a better cost, and may be owned by the brands

Sources

AMDA, Economic Consulting Associates. "Benchmarking Africa's Minigrids." August 2020. <https://shellfoundation.org/app/uploads/2020/08/AMDA-Benchmarking-2020.pdf>

Borgstein, Edward and Dawit Mekonnen (International Food Policy), Kester Wade. "Capturing the Productive Use Dividend: Valuing the Synergies between Rural Electrification and Smallholder Agriculture in Ethiopia." Rocky Mountain Institute. April 2020.

JUMEME Presentation. Productive Use of Energy Applications in Off-Grid Energy Systems - Workshop. June 2019.

Powerhive Presentation. Productive Use of Energy Applications in Off-Grid Energy Systems - Workshop. June 2019.

Power for All Fact Sheet. Mini-grids productive use of energy (PUE) in agriculture. June 2020.

Bharadwaj, Abishek. Equatorial Power, Chief Technology Officer. Interview. 6 August 2020.

Bhattacharya, Jit. Factor[e] Ventures. Interview. 17 September 2020.

Carr, Matt. Agsol. Interview. 9 April 2020.

Chambers, Tim. InspiraFarms. Interview. 13 May 2020.

Dhameliya, Isham. Ecozen. 15 May 2020.

Ducroix, Eric. Kaizen Consult. 20 May 2020.

Faison, Eugene. DGrid. 14 May 2020.

Hyder, Kate. Root Capital. Interview. 28 April 2020.

Ibrahim, Samir. SunCulture, CEO. Interview. 29 July 2020.

Lovin, Erika. Crossboundary Mini Grid Innovation Lab. 22 April 2020 and 17 September 2020.

Miller, Emma. Shell Foundation. Interview. 14 July 2020.

Nyambok, James. Root Capital. Interview. 28 April 2020.

Perez, Esteban. Sunkofa, Chief Technology Officer. 7 April 2020.

Ridolfi, Riccardo. Equatorial Power. Interview. 14 April 2020.

Ruchiu, David. Farm Concern International, Africa Director. Interview. 28 May 2020.

Sankar, Rebecca. AgDevCo. Interview. 20 August 2020.

Schiefermueller, Leo. JUMEME, Board Member. Interview. 13 October 2020.

Scheiber, Kevin. PowerGen. Interview. 28 May 2020.

Vendeirinho, Vivian. RVE.Sol, CEO. Interview. 14 April 2020.

Weston, Peter. Energy4Impact, Director of Programmes. Interview. 23 October 2020.

Whalley, Roseanne. AHL Venture Partners. Interview. 5 August 2020.

Willi, Lars. WeConnex, CEO. Interview. 2 August 2020.