



ONE YEAR ON: PAYING FOR DARKNESS

Strengthening Solar Markets for Refugees in Uganda

JANUARY 2021

Overview & Sales

In the first half of 2018, Uganda was the fifth-ranked country for off-grid solar (OGS) units sold globally and the second leading country for solar home system pay-as-you-go (PAYGo) unit sales. The confluence of a strong OGS market and mobile money sector makes Uganda one of the world's leading PAYGo solar markets, with a very high potential for expansion into underserved markets and difficult operating environments. As such, Mercy Corps adopted a market systems development (MSD) lens to identify the potential for a future beyond in-kind distributions where local energy systems would provide for the unmet energy needs of the 1.4 million refugees currently hosted in Uganda.¹

In June 2019, Mercy Corps conducted a market systems analysis in the Bidi Bidi refugee settlement to identify the key barriers to OGS and PAYGo products reaching refugee and host consumer markets, which were detailed in the *Paying for Darkness* report.² From November 2019 to July 2020, Mercy Corps implemented activities addressing five identified market constraints³.

This paper summarizes the outputs of a short evaluation undertaken in early 2020 to assess the intervention's impact, and extract learning for future interventions. The evaluation comprised of key informant interviews with program field teams, sales agents, community leaders and 184 community members⁴. An analysis of sales and repayment data from OGS and PAYGo suppliers involved in piloting new models for financing and distribution of products in the Bidi Bidi area was also conducted. Initial sales data **vastly outperformed initial program targets, demonstrating that** a market systems approach to strengthen access to solar energy products could be successful, even in remote and underserved refugee markets.

Intervention Strategies: Progress and Learning to Date

The initial market system analysis proposed a set of interventions to address five key constraints in the energy



SALES OUTPERFORMED PROGRAM TARGETS

2,489 customers (including 30 SMEs) purchasing 3,918 units (some customers purchased more than one product) within 3 months. This outperforms initial targets of 200 units.

- 3,315 cash sales for solar lanterns
- 603 PAYGo sales for solar systems
- 80% refugee customers overall
- 55% female customers overall

Photo: Mercy Corps, Bidi Bidi, Uganda

¹ UNHCR. Figures at a Glance, and UNHCR and Uganda Joint Multisectoral Needs Assessment, 2018

² Mercy Corps. [Paying for Darkness: Strengthening Solar Markets for Refugees in Uganda](#), 2018

³ Identified market constraints: 1) product appropriateness and availability 2) demand perception 3) market linkages and infrastructure 4) appropriate finance and, 5) quality assurance and trust

⁴ 107 women and 77 men with two thirds refugee respondents aged between 17 to over 65 years),

market system. This section summarizes findings from implementing the prioritized interventions across the energy market system.

Product Appropriateness & Availability

Interventions sought to address a mismatch between what energy products are currently on offer and what refugee and host community members want and can afford in order to increase last-mile demand for solar.

Intervention progress: As part of the initial market analysis, Mercy Corps developed an initial segmentation of consumers (based on income sources, displacement status, and gender) within the targeted vulnerable groups. The four major consumer segments identified included: those Unable to Work, Farmers, Female MSME Owners and Male MSME Owners.

This segmentation distinguished each sub-group's unique needs, behaviors, and energy product preferences. For example, female "unable to work" consumers preferred portable lanterns purchased in cash, while small business owners preferred larger solar home systems. This information was shared with OGS suppliers, who responded by offering a range of solar products and financing options (from small lanterns to large solar home systems). Sales data suggests that the **initial segmentation assumptions were valid** and supported appropriate product targeting, price offerings and payment plans to different customer segments.

Community leaders also noted that the increased variety of products on offer that targeted varying consumer needs was key to stimulating greater demand. Irrespective of gender, the primary reason for purchasing a solar product was for a child's education, which should be considered in future marketing materials.



Segmenting consumers by gender, displacement status, and source of income led to appropriate supply and financing solutions while also supporting inclusivity objectives.

Insights for Future Programming: Implementation data also yielded additional insights about the targeted segments, which can shape future interventions, as follows:

- **Inclusion of products that are easily mobile:** these features are important for the *Unable to Work* segment where lights need to be mobile to support household tasks and used independently by the infirm;
- **Larger proportions of farmers and MSME owners may be able to purchase larger SHS systems:** data suggests that approximately 20% of farmers and 60% of MSME owners earn between 40000-80000+ UGX per calendar month (significantly higher than the average income previously calculated). This means that the average repayment per month for a SHS falls between 11%-28% of the consumer monthly income (as the repayment amount for PAYGo is between 8,781-11,515 UGX
- **All segments would consider 12-month loans at piloted repayment amounts⁵** Prior to the pilot, all segments preferred payments upfront or short loan periods. However, it was identified during the pilot that all consumer segments would accept longer repayment periods e.g. 24 months, which could allow for a smaller subsidy or its complete removal in the future.

⁵ Repayment amount included a 60% subsidy (further reduced to 50% for phases two and three)

The piloting also identified that within the *Unable to Work* segment there are groups of people that continue to be excluded from the energy market system despite the intervention, and these include the disabled, elderly and sick.

Segment	Vulnerable Groups	Farmers	Female MSME Owner	Male MSME Owner
Profile	Hosts & Refugees Male & Female Disabled / Caregivers / Elderly	Hosts & Refugees Male & Female	Hosts & Refugees Female only	Hosts & Refugees Male only
Prioritized value of energy product	Children's education Night time safety for travel/water collection / shopping Single lights (easy to hold and for single households)	› Children's education › More bulbs for more rooms › Night time safety for travel/ shopping › Phone charging	› Children's education › Night time safety for self and business facilities › Phone charging	› Access to information and communication for business purposes › Large power source
Calculated disposable income	8000 UGX per month (no significant segmentation trend in results)		MSME at 18,000 UGX (average though male MSMEs may be higher)	
Energy product matches	Wind up / dry cell torch Mobile phone charging 50 lumen solar	Wind up / dry cell torch Mobile phone charging 220 lumen solar	Wind up / dry cell torch Mobile phone charging 220 lumen solar 6W SHS	
Payment requirements	Cash Payment up front	Cash Loan up to 9 months	Cash / Mobile money Loan up to 12 months ³¹	

TABLE 1: NEW CONSUMER SEGMENT (ADAPTED FROM PAYING FOR DARKNESS (2019))

Segment	Marginalized (new)
Profile	<ul style="list-style-type: none"> • Male & Female • Hosts & Refugees • Disabled / Elderly / Sick • Aid dependent
Prioritized value of energy product	<ul style="list-style-type: none"> • Access to information • Single lights. Easy to lift/hold for mobility and meets limited lighting requirements for single-person households

Calculated disposable income	~ 5500 UGX pcm
Energy product matches	<ul style="list-style-type: none"> • Wind up / dry cell torch • Mobile phone charging • 50 lumen solar
Payment requirements	Cash / upfront payment as unable to pay in instalments due to inability to interact with market activation campaigns, access mobile money or customer service centers as they require leaving the household

Demand Perception

Interventions sought to address the perception of low demand due to limited purchasing power within the refugee community amongst OGS suppliers in order to reduce the cost of last mile customer acquisition.

Intervention progress: The market analysis proposed that seasonality affected purchasing behaviors within these communities and as such demand for energy products correlated to the time of year. Pilot sales saw companies reaching most of their targets during the harvest period from November-December. However, sales were substantially less during the 'leaner' season from January onwards, confirming original hypotheses around seasonality of sales. Only 13/184 respondents saw no increase in income in harvest period, with estimates of a 243% overall increase across all income segments. People can pay a down-payment for their preferred product across all consumer segments during harvest periods.



"This information was new to the companies. Prior information had been anecdotal and not backed by empirical data. The Paying for Darkness report provided more robust evidence to build trust for piloting"

— Program Manager, Mercy Corps, Uganda

Insights for Future Programming:

It was highlighted that posters indicating the future dates, times and costs of products in the market triggered decisions for potential consumers. This information allowed people to start saving for products in advance and making

arrangements to view the products if it required travel. Future interventions should schedule awareness raising activities one month prior to sales so that consumers have sufficient time to prepare and save a deposit or purchase amount.

Market Linkages & Infrastructure

Interventions sought to address the higher operational costs associated with poor linkages and limited infrastructures in the area in order to reduce the cost of last mile distribution.

Intervention progress & Insights for Future Programming: The ability to have service centers, partner with distributors and establish warehousing within Bidi Bidi has reduced the cost and risk of last mile distribution, maintenance and payments. To improve distribution, OGS suppliers used a combination of:

- Sales agents recruited from local VSLAs (given their awareness of local consumer, knowledge of the area, and access to female consumers);
- Market activation campaigns, with support with Mercy Corps and VSLAs and
- The establishment of local service centers, warehousing and retail points (through existing local infrastructure, namely the Mercy Corps Innovation Centers and the ENventure energy cooperative)



62% of respondents state that being about to see before you buy as their primary requirement for purchasing a solar product

This approach has enabled customers to see the products. This is a pertinent point, particularly if there is a tendency for OGS suppliers to switch to field sales agents who may not carry products to view to new customers. Mobile-based payments are still an issue especially for refugees with disconnected lines and limited access to mobile money agents. Unless the constraints to using mobile are addressed the majority? of people would prefer cash payments but there is an opportunity cost of traveling to service centers to pay.

Appropriate Finance

Interventions sought to create more flexible financing to accommodate inconsistent income streams in order to increase ability to pay for certified solar products and reduce credit risk to OGS suppliers.

Intervention progress: Suppliers agreed to pilot the suggested payment structures for PAYGo products⁷ with a cost-sharing proposal. Mercy Corps paid for a subsidy in the pilot phase to prove that consumers will be able to repay loans at a certain monthly price (approximately \$2.37-\$3.13 USD per month). The size of subsidy, starting at 60% (further reduced to 50% for phases two and three) of the overall price, lowered the price to an affordable monthly payment over a 12-month period (instead of usual 24-36 months). The intervention was phased to allow for iteration and decreasing of subsidy over time. Phase 1 focused on promotion of small lanterns and solar home systems paid through cash upfront or PAYGo. The second and third phases were for PAYGo products only. It was initially proposed that VSLAs may be able to extend credit to parts of the target group unable to obtain loans from OGS suppliers, however, during the design phase, it was determined that they did not have the internal capacity to manage this.

Overall, PAYGo customers are farmers and MSME owners only. The changes to the PAYGO payment structures anecdotally saw more consumer interest in bigger systems, however, the 3-month saving period for consumers was not introduced. If people did not have the



After the subsidy of lower-priced cash-only solar products ended, sales have continued at full price in the area⁶.

⁶ As of July 2020, an additional 143 solar products were sold by the companies outside of the RBF incentive

⁷ Proposed in Table 6 of the *Paying for Darkness* report

initial down payment to get the product, then they selected lower priced solar options.

Insights for Future Programming: The pilot period enabled validation of many of the original hypotheses around appropriate finance, and with need for additional validation.

TABLE 2: LOAN STRUCTURE LEARNING (ADAPTED FROM PAYING FOR DARKNESS (2019))

Potential Loan Structure	Hypothesis Validation
Lead time to secure higher deposit of 3 months	TRUE. This is true for over 50% of respondents with the majority needing just one month regardless of income band to secure the deposit.
Pay deposits in high income period	TRUE. Community leaders noted this to be a key selling point regarding affordability. Phasing of the interventions displayed decreased sales outside of the harvest period.
Maximum 9-12 month loan period	TRUE BUT EXTENSION MAY BE POSSIBLE. The pilot has shown increased willingness to pay using 12-month loans (with subsidy) with consumer segments previously unwilling to take on loans likely due to the repayment affordability. If loans were extended longer than 12 months with lower monthly payments, consumers may be willing to pay for longer and less subsidy may be required.
Ability to pay monthly instalments even during lowest income periods	FURTHER MONITORING REQUIRED. Repayment data from one supplier indicates only 50% are paying on time but does not identify the root cause for delays or whether a specific type of customer is involved. This needs to be further validated alongside potentially piloting a payment plan provided that looks at extending loans and lowering payments in non-harvest months vs harvest months.

Quality Assurance & Trust

Interventions sought to address a lack of consumer awareness of OGS quality standards and certified products in order to increase last-mile demand for certified solar products.

Intervention progress & Insights for Future Programming: There is greater awareness of quality products and consumer protection rights but there is still room for improvement outside of pilot areas. Importantly, the vast majority of respondents would direct issues to the OGS providers, not Mercy Corps. Compared to the initial *Paying for Darkness* survey in which consumers implied they had no sources of information on solar products, this has improved significantly with the majority now having access to multiple sources. People also know they can get a warranty but it is unclear if people understand their warranty rights and if the warranty actually works with suppliers given the short pilot timeframe. The majority of respondents are very happy or happy with their solar products and service. Community leaders noted that enquiries about purchasing solar products were arising daily and confirmed that word-of-mouth positive feedback and visibility of solar product quality from neighbors are driving demand for solar.

Maintaining momentum: potential for sustained change in Bidi Bidi

MSD programs are usually multi-year in nature to accommodate the timeframes for embedding sustained, systemic change within market systems. However, this evaluation provides an indication that project interventions were heading in the right direction and the field assessment methods used were sufficient in providing the right data to inform the intervention designs and follow-on activities. Work to date has validated strong energy market potential in the Bidi Bidi area and beyond if local systems continue to be strengthened, whilst being careful to highlight that marginalized groups will need more tailored interventions to ensure they are not left behind.

Applying methods to identify consumer segmentations within the target group could serve to build more inclusive and sustainable market interventions. There is often a fear that market systems approaches will be unable to meet the needs of marginalized groups and, as such, in-kind distributions can be used as a default to ensure everyone is reached. In doing this the potential for more sustainable approaches developed in partnership with local public or private systems are often lost. The detailed consumer segmentation in the Bidi Bidi area has allowed the sector to more confidently determine whose needs may be met through supported local energy markets, and reveal more clearly who may be excluded. The important point here is that the effort to meet needs through local market systems reduces distortion and reserves targeted aid for those who will continue to find it challenging to interact within a market system.

Facilitation also requires movement away from traditional procurement of pre-determined contractual requirements with local actors and a sharing of inputs into design, investment and risk of interventions. Co-designing proposed interventions allows for market actors who will ultimately be piloting changes (and hopefully sustaining them into the future) to highlight potential design iterations derived from their knowledge / experience as well as share in the potential risks in delivering the changes to build ownership in outcomes.

Encouragingly, the two OGS suppliers involved in the pilot expressed intentions to remain in the area to continue assessing market demand. One company wanted to validate the repayment curve of the 12-month loans before any further sales and expansion into the area, and they confirmed that repayment rates from refugees were similar to the ones experienced in the host community across their portfolio. This company would need to invest in renting or building local infrastructure, as they were not using local retailers as distribution points. The second company intended to continue selling solar lanterns through ENventure retailers in order to reduce the costs of last-mile distribution. They also noted that repayment from refugees was equivalent for that of the host community across their portfolio. Continuing to collect and monitor this type of information will help to build evidence for market-based interventions in refugee settings. It is not currently known whether the changes employed by these interventions have expanded into areas outside of Bidi Bidi by market actors outside and this would need to be assessed in the future as well as the current state of consumer opinion of certified solar products.

It should be noted that this evaluation was delivered before the COVID-19 outbreak and can only be used to determine how the market systems approaches were functioning and responding to interventions within that context. The energy sector has been adapting to these changing circumstances and agencies should attempt, in the first instance, to understand the new constraints imposed on the system and work with local market systems, where possible, to support recovery and minimize energy asset losses at household level.

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About Mercy Corps

Mercy Corps is a leading global organization powered by the belief that a better world is possible. In disaster, in hardship, in more than 40 countries around the world, we partner to put bold solutions into action — helping people triumph over adversity and build stronger communities from within. Now, and for the future.



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