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OXFAM

MERCY CORPS

LEARNING BRIEF

ADVANCING MARKET-DRIVEN CLEAN ENERGY SOLUTIONS IN REFUGEE & HOST COMMUNITIES

AUGUST 2025

Acronyms

Acronyms	Full Form
CARE	Cooperative for Assistance and Relief Everywhere
CCS	Clean Cookstove
CECI	Community Empowerment for Creative Innovation
CO2	Carbon Dioxide (used in context of emission reductions)
CRRF	Comprehensive Refugee Response Framework
CSA	Climate-Smart Agriculture
ESCO	Energy Service Company
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Development Agency)
ICAN SS	Integrated Community Agriculture and Nutrition – South Sudan
IOM	International Organization for Migration
MC	Mercy Corps
MSD	Market Systems Development
NGO	Non-Governmental Organization
PUE	Productive Use of Energy
RLO	Refugee-Led Organisation
SERP	Sustainable Energy Response Plan
SUSTAINED	Supporting Stronger Access to Innovative Energy Solutions in Displacement Settings
UECCC	Uganda Energy Credit Capitalisation Company
VSLA	Village Savings and Loan Association

Executive Summary

Uganda hosts over 1.9 million refugees, with nearly half residing in West Nile settlements where energy access remains critically low. The SUSTAINED project, led by Mercy Corps, Oxfam, and CARE, aims to transform this landscape by promoting renewable energy and Productive Use of Energy (PUE) solutions tailored to displacement settings.

The project's foundational phase reveals that market systems and private sector engagement have the potential to expand access to solar technologies, clean cookstoves, and energy-enabled livelihoods. However, affordability, limited awareness, and infrastructural gaps hinder uptake. Targeted subsidies, policy alignment, and community engagement are crucial for maximum impact.

The phase has also generated critical insights and messages into how renewable energy and PUE can be effectively deployed in refugee-hosting settlements. These key messages distil the most actionable and strategic learnings for stakeholders, consortium partners, government ministries, private sector partners, and energy practitioners, who are positioned to drive scale, policy alignment, and inclusive impact. They reflect both the opportunities and challenges encountered, and offer an opening for advancing energy access and livelihoods in displacement contexts.

Table 1: Showing Key Messages of different stakeholders

Stakeholder Group	Key Messages
Donor Agencies	- PUE (solar water pumps) and clean cooking solutions are viable, impactful investments in refugee contexts. - Market-based approaches are unlocking scalable, inclusive energy access. - Strategic subsidies and blended finance are needed to overcome affordability barriers.
Ministries, Departments & Agencies	- Policy alignment and regulatory clarity are essential to support off-grid energy markets. - Coordination across energy, refugee affairs, and environment sectors is critical. - Gender-responsive energy planning must be institutionalized.
Humanitarian Actors such as Mercy Corps, Oxfam, and CARE	- Energy access is a foundational enabler of protection, livelihoods, and resilience. - Integrating PUE into humanitarian programming enhances sustainability. - Community sensitization and capacity building are vital for uptake.
Private Sector Partners	- Refugee-hosting areas present untapped markets for solar, clean cooking, and energy services. - MSD approaches are reducing entry barriers and fostering viable business models. - Partnerships with NGOs and local groups can de-risk operations.
Energy Practitioners	- Innovations like solar irrigation, cold storage, and energy kiosks are transforming livelihoods. - Technical support and training are needed to scale PUE applications. - Monitoring and adaptive learning are key to refining interventions.

The SUSTAINED Market Systems Development Delivery Model

The Market Systems Development (MSD) model employed by the SUSTAINED Project represents a strategic shift from basic energy product distribution toward building inclusive and resilient energy markets. Anchored within Uganda's Comprehensive Refugee Response Framework (CRRF) and the Sustainable Energy Response Plan (SERP), the model promotes policy alignment, stakeholder coordination, and positions energy access as a driver of livelihoods, gender inclusion, and environmental sustainability.

A key strength of the MSD approach is its integration of both demand and supply-side interventions. On the demand side, consumer sensitization and leveraging on the Village Savings and Loan Associations (VSLAs) help address affordability and behavioural barriers, encouraging the uptake of clean cooking technologies, and productive energy technologies, such as solar irrigation. On the supply side, the model supports enterprise incubation, youth skilling, and cooperative development to build a local workforce capable of delivering last-mile services and managing energy infrastructure.

The model was implemented through strategic private sector engagement, supplier–community linkages, and adaptive financing mechanisms. ESCOs were incentivized to enter refugee-hosting markets via targeted subsidies and risk-sharing mechanisms, which de-risked operations and expanded last-mile delivery. Youth agents and community-based demonstrations, timed with community events such as World Refugee Day and Women's Day, created trusted entry points and stimulated demand, particularly among women and youth. Gender-inclusive pricing and installment schemes were piloted to address affordability constraints, laying the groundwork for future carbon-linked financing. Additionally, short-term capacity building efforts in financial literacy, and enterprise readiness catalyzed early adoption and strengthened local ownership.

However, several challenges persist. Behaviour change does not automatically follow awareness or access to finance, as cultural preferences, low willingness to pay, and gendered decision-making often hinder adoption. Newly incubated enterprises also face viability risks due to limited market size, weak governance, and financing gaps.

Supplier engagement remains difficult, with refugee settlements viewed as high-risk, low-margin markets. More robust tools, such as innovative financing schemes, embedded distribution models, and quality assurance mechanisms, are needed to strengthen commercial relationships and protect consumers. To enhance the model's impact, the study recommends conducting behavioural validation studies, applying enterprise readiness scorecards, piloting flexible financing mechanisms like pay-as-you-go and bulk purchasing, and using contribution analysis to better link MSD activities with empowerment, resilience, and environmental recovery outcomes.

Key Lessons Learnt from SUSTAINED Project on PUE and Renewable Energy Uptake

Stimulating Demand Through Layered Outreach: The project demonstrated that culturally resonant, multi-channel outreach is essential for driving demand for PUE and clean cookstove (CCS) technologies. Campaigns that combined drama, radio, market activations, and demonstration visits were particularly effective in reaching remote and refugee-hosting communities and aligning activities with local calendars, such as commemorations of World Environment Day and Women's Day Celebrations, enhancing visibility and community engagement. However, delays in media deployment and mismatches in product preferences (e.g., Ecochar vs. Ecowood) highlighted the need for synchronized, evidence-based demand activation strategies. These insights underscore the importance of early diagnostics and strategic media rollout in ensuring product-market fit and sustained interest.

Figure 1: Project Teams participating in Women's Day Celebrations in Yumbe District in March 2025

Coordinated Supply-Demand Activation Enabled Technology Uptake: The project's intentionally sequenced activities, awareness sessions, agent mobilisation, and retailer partnerships proved instrumental in synchronising demand and supply for renewable energy technologies. Through joint sessions involving Mercy Corps, Oxfam, CARE as partners, RLOs, and ESCOs such as Tulima Solar, D.Light, and local agents, 170 participants expressed interest in solar solutions. This translated into the installation of 42 solar water pumps and 12 clean cooking stoves. By aligning market actors and end users, the intervention demonstrated how thoughtful coordination catalyzes uptake and reinforces linkages across the energy ecosystem.

Strengthening Market Systems and Last-Mile Delivery: The study reveals the potential and limitations of implementing PUE technologies in the retail sector. Community-based sales agents, equipped with stipends, mobility tools, and digital literacy training, effectively engaged 422 individuals and increased retail visibility. However, incomplete distribution networks and

Figure 2: Sales Agents receiving bicycles to ease their mobility

delayed dealer onboarding hindered adoption, especially in underserved areas. The study emphasizes the need for early investment in retail infrastructure, mobile sales strategies, and vendor onboarding, while emphasizing the importance of human capital and consistent incentives for overcoming last-mile barriers and accelerating technology adoption. However, moving forward, more emphasis should be put on a commission-based system for future sustainability engagement between agents and ESCOs.

📌 Leveraging Group Savings for Energy Access

The Paji Toto Farmers and Savings Group in Kerwa Subcounty, a refugee-hosting community, has successfully demonstrated how internal lending mechanisms can unlock access to clean energy technologies. Through a structured three-month loan facility at a minimal interest rate, members acquired charcoal-efficient cookstoves and solar lamps, products that were previously unaffordable due to high upfront costs.

This community-led financing model has fostered financial inclusion, strengthened social cohesion, and built confidence in repayment systems. Members are now exploring expansion into other PUE technologies, such as solar-powered irrigation and phone charging stations.

To scale this model, the group aims to grow its monthly savings from UGX 1.4 million to UGX 10 million over the next 36 months. Achieving this target will require targeted support in two critical areas: timely access to farm inputs and reliable market linkages for agricultural produce. These enablers are essential for boosting income generation and sustaining energy investments in displacement settings.

Financial Inclusion as a Catalyst for Uptake: Group-based financing models, such as savings groups and cooperatives, have proven effective in enhancing the affordability and uptake of energy technologies. Weekly contributions enabled internal lending for farming inputs and household needs, fostering financial discipline and resilience. However, informal group status limited access to formal credit, as evidenced by Green Valley's inability to secure financing from the Vision Fund due to a lack of formal registration. Tailored financial products, including PAYGO and seasonal models piloted by ASIGMA, aligned with refugee income patterns, helped to moderate affordability barriers. Financial institutions also need to develop and pilot individual seasonal financing loans to align with the gestation period of agro-enterprises such as vegetables that provide high value returns for small-sized plots often available to refugees. These mechanisms must be integrated with demand activation strategies and supported by institutional actors to ensure scalability and resilience.

Partnerships and Stakeholder Engagement: The project's strategic alliances and inclusive stakeholder engagement, including collaborations with Tulima Solar, Vision Fund, and refugee-led organisations (ICAN SS& CECI), played a critical role in its success. Participatory platforms like community review meetings and drama groups fostered local ownership and trust. These structures were particularly effective in Kerwa, Kulikulinga, Romogi, and Zone 1, where interest from both refugee and host individuals was strong. However, gaps in coordination, such as delayed Go-to-Market strategies, hindered alignment and continuity. Early stakeholder mapping, co-creation with local actors, and energy solutions embedding are crucial for sustained impact and equitable market transformation.

"We appreciate the localization of activities—national-level partners working with local stakeholders who understand the refugee context. This improves service delivery and project outcomes."— Programs Manager, CECI.

Gender Inclusion, Youth Participation and Adaptive Programming: The project's inclusive outreach and gender-responsive engagement were crucial in its success. Strategic recruitment of youthful agents and alignment with key community observances, such as World Refugee Day and International Women's Day, provided culturally resonant entry points for engaging women and youth. During these events, ESCOs showcased clean energy products and services to predominantly female and youth audiences, fostering awareness, practical understanding and appreciation of the products. These demonstrations catalyzed interest and stimulated demand, particularly among women-led groups.

Gender-inclusive procurement models played a critical role in reinforcing equitable reinvestment within the project. For instance, the acquisition framework for the ECOCA Solar Cooker enabled women to purchase the unit at UGX 680,000, compared to UGX 720,000 for their male counterparts, following a targeted subsidy from UECCC that reduced the original market price of UGX 1.8 million. Similarly, in the Green Valley Farmers' Group, women were prioritized to lead the acquisition of a second water pump at UGX 670,000, a rate otherwise set at UGX 720,000 for male-led purchases.

These differentiated pricing strategies not only enhanced access for women but also signalled a deliberate shift toward inclusive asset ownership and gender-responsive reinvestment. They ensure that women, who often face disproportionate economic constraints, can access high-value assets like solar cookers and water pumps. Women-led groups demonstrated high interest in clean cooking technologies, but documentation barriers limited uptake. Adaptive programming, including pivots in product strategy and flexible implementation, responded to operational delays and deepened equity outcomes.

Green Valley Farmers Group's Journey to Resilience & Improved Incomes

For the Green Valley Farmers Group in Kerwa subcounty, the arrival of a solar irrigation pump through the SUSTAINED project marked a turning point. In its very first season of use, the group cultivated a diverse range of vegetables and sold them to the market in Yumbe, earning an impressive UGX 1.4 million. This was a dramatic leap from the UGX 200,000 earned in the previous harvest, underscoring the pump's catalytic role in boosting productivity and unlocking market potential.

But the impact didn't stop at income. The group made strategic use of its earnings: part of the funds went toward expanding farmland and intensifying production, while the rest was earmarked for acquiring a second solar pump. In a powerful gesture of inclusion, the group chose to purchase the new pump through its women members, who benefit from preferential pricing under the project, UGX 670,000 compared to UGX 720,000 for men. This gender-responsive procurement model not only promotes equitable access to productive-use technologies but also affirms the group's commitment to inclusive growth.

From increased yields to empowered decision-making, the project is demonstrating that with the right tools and a shared vision, transformation is not only possible, but also sustainable.

Demonstration and Market Integration: The establishment of four localised demonstration sites, three solar water pumps and one solar-powered flour mill served as tangible proof of concept, accelerating behavioural change and catalysing demand for clean energy technologies. These sites functioned as experiential learning hubs, enabling direct community interaction with PUE and CCS products, which fostered trust, demystified technology, and encouraged replication. With 27 farmer groups visiting the solar installations, participants explored improved input use and planting techniques, with three groups expressing intent to purchase pumps for the dry season. Integration of these technologies into weekly markets and community fairs further normalized their presence within local economic systems, positioning them as viable commercial goods and enhancing sustainability through community-led innovation.

Table 2: Tulima solar staff demonstrating how to use a solar pump to farmers

Service Delivery and Technical Support: Localized service delivery was key to ensuring accessibility and reliability. ESCOs supported by Mercy Corps, established sales and post-sale service centers within settlements, offering reliable after-sales care. ESCOs trained youth, women, and refugees in installation and maintenance, promoting long-term ownership and confidence in energy solutions. However, technical capacity gaps persisted, with some members in groups such as Paji Toto were found to lack expertise to do minor appliance operations. Future programming should strengthen community-based technician training and supplier–community service protocols to ensure durability and user satisfaction.

Persistent Market Barriers Highlight the Need for Adaptive Programming: Despite successful implementations, systemic constraints persist that threaten sustained market development. These include recurring stockouts of D.Light stoves, high interest rates from financial service providers (3% monthly), initial low ESCO participation in sector events, and delayed mill upgrades at demonstration sites. These challenges underscore the importance of iterative design and feedback loops within MSD programming to address supply chain bottlenecks and enhance partner coordination, especially as interventions expand.

E-Waste Management and Environmental Stewardship: In partnership with International Organization for Migration (IOM), the project supported the establishment and operationalization of an E-Waste cooperative in BidiBidi creating awareness on repair of

electronics such as solar lanterns, radios, solar panels and others. The collaboration has fostered an improved E-waste circular economy with broader community knowledge on safe E-waste disposal leading to better air and soil quality. This collaboration included training of cooperative technicians in partner solar technologies improving after sales technical support for refugees and hosts who purchase these products.

Policy Influence and Coordination: A supportive policy and coordination environment was critical for scaling renewable energy solutions. The project strengthened advocacy networks and integrated safeguarding systems into energy programming. Dissemination of learnings to external stakeholders informed broader market-based approaches and clean energy policy dialogue. The identification and engagement of 86 community groups proved foundational for mobilization, training, and sustained interest in PUE and CCS technologies.

Leveraging Targeted Subsidies to Unlock Renewable Energy Access in Vulnerable Contexts: UECCC's experience in refugee settlements shows that well-targeted, results-based subsidies can significantly accelerate renewable energy adoption when they address affordability, are delivered through certified suppliers, and reach last-mile users. A 60% subsidy reduced the price of ECOCA's solar products from UGX 1.8 million to UGX 720,000, making them accessible to more households. These interventions not only improve affordability but also support Uganda's climate goals by reducing biomass and kerosene use, while opening pathways for future carbon credit benefits. Crucially, such subsidies stimulate both household and productive use uptake, enhance livelihoods, and reduce environmental strain—proving most effective when market-aligned, quality-assured, and locally anchored for lasting impact.

Figure 3: ECOCA presents to the Participants during the inception meeting

Figure 4: d.Light presents charcoal and wood-efficient energy-saving technologies

Key Barriers to Renewable Energy Access and Uptake of PUE Technologies

1. Affordability Constraints

Affordability challenges hinder access to solar and clean cooking technologies in refugee settlements. Despite piloting financing models like seasonal payments, uptake remains low due to irregular incomes and financial exclusion, especially among informally registered groups like the Green Valley Farmers Group. The limited financial service providers within the refugee settlements also complicates access to credit. Currently, Vision Fund is the major FSP working under the project to support credit access. High interest rates (e.g., 3% monthly) further limit access to credit, even for trained VSLA members. While some market linkages exist, the lack of tailored financial products, such as pooled lending or flexible plans, prevents widespread adoption. Formal registration emerges as a key enabler for financial inclusion and institutional resilience, though perspectives within the consortium vary. Even though one of the consortium partners had a different perspective;

"The mindset of receiving handouts from development partners by the refugees is a deterrent to PUE uptake. They are still expecting handouts, rather than working for themselves to achieve self-sustenance."— OXFAM Project Technical Lead

2. Limited Access to Tailored Financial Products

Refugee communities in Uganda face major barriers to accessing financial products due to lack of collateral and the perceived risk of lending to mobile populations. With climate finance still underdeveloped, most groups rely on informal savings, which are inadequate for purchasing high-cost PUE appliances. Although installment plans exist, irregular incomes make them impractical. Donor subsidies from UECCC and GIZ aim to improve affordability, but high import taxes, up to 33%[1], undermine their impact, keeping prices out of reach, especially for women-led households. Short-lived financial literacy efforts have had limited effect, leaving savings groups ill-equipped to invest confidently in clean energy solutions.

"The groups mobilized were not enterprise-oriented. The profiling criteria didn't accommodate FSP needs—it must be a money-making group like a VSLA, not just youth or farmer groups."— Programs Manager, CECI.

3. Weak Supply Chain and Distribution Networks

Clean energy products in displacement settings face weak supply chains and distribution networks, causing inconsistent availability and limited visibility. Logistics issues, such as frequent stockouts, hinder awareness campaigns and mobilization efforts. Remote zones lack accessible retail sales points, restricting user engagement. Retailers and community-

[1] For most imported energy products, the effective tax rate can reach up to 33%, combining VAT and withholding tax—even if import duty is waived

based agents lack reliable inventory systems and logistical support. Distribution infrastructure is weak at the sub-county level, and clean cooking solutions, charcoal-efficient cookstoves, remain unavailable or unaffordable. Strengthening last-mile distribution through mobile sales, vendor onboarding, targeted vouchers, and improved linkages is crucial for sustainable adoption. One respondent confirmed that;

"The places are very distant, coupled with impassable roads during the rainy season, making operational costs very high."— Vision Fund, Fundraising and Project Officer

4. Low Technical Capacity

Low technical capacity in displacement settings hinders energy access, particularly for women, youth, and refugees. The lack of skills in installation, maintenance, and repair of solar and clean cooking technologies reduces user confidence in product reliability, discourages adoption, and limits local job creation and the growth of an inclusive energy market. Community groups lack local expertise for troubleshooting or repairs, leading to dependency on distant suppliers and further discouraging uptake. Addressing this challenge requires targeted training of more community members, but also more emphasis on refresher trainings to the existing community-based technicians and supplier-community service protocols to ensure sustained functionality and build trust in renewable energy solutions.

5. Limited Awareness and Demand Activation

A lack of awareness and understanding among communities hinders the adoption of renewable energy technologies in displacement settings. Despite campaigns, uptake has been slow, especially in remote and refugee-hosting areas. Low visibility of PUE technologies and insufficient hands-on demonstrations contribute to this issue. To convert initial interest into sustained adoption, behavioural change and trust-building are crucial. Awareness activities reached only 11% of the target, indicating a significant shortfall in community coverage. Knowledge, Attitude, and Practice (KAP) indicators are under-assessed, and access to after-sales services and warranty literacy is limited. Promoting bundled service packages, group-based procurement models, and tailored conversion pathways, particularly for clean cooking and energy entrepreneurship for women and young people, is essential for enhancing sustainability and driving broader adoption.

"Behavioural changes take time. People are still accustomed to traditional cooking methods, which they believe are tastier. We had to conduct demonstrations using super users from the previous project to show how it works."— ECOCA Business Manager

Despite challenges, groups demonstrated adaptive capacity and intent to scale. They earmarked savings for future appliance purchases and expressed interest in formalizing operations for financial services. Clean cooking technologies, particularly among women, offer opportunities for targeted subsidies and inclusive access protocols. Gender-responsive procurement, savings-led financing, and solar irrigation are powerful economic empowerment tools in displacement settings.

Recommendations for Enhancing Market System Development for PUE Technologies uptake

Drawing from the SUSTAINED project results and implementation insights, the following programmatic recommendations are proposed to strengthen market viability, stakeholder engagement, and adaptive delivery of PUE solutions in displacement settings for the relevant stakeholders:

a) Development Partners

- Bridging Awareness and Access through MSD-Aligned Mobilization: To strengthen market systems and ensure sustainability, development partners should invest in well-timed community mobilization that bridges the gap between awareness and access. By aligning outreach with seasonal events and local calendars, such efforts can aggregate demand, lower end-user costs, and maintain supplier engagement. For example, during Women's Day in Yumbe, coordinated demonstrations led to bulk discounts and group purchases, showing how strategic mobilization can drive both product uptake and market viability.
- They should also support the institutionalization of market intelligence through participatory diagnostics and digital KAP tracking tools, enabling adaptive programming.
- Leveraging Blended Finance to Strengthen Market Systems: To enhance affordability and financial inclusion in displacement settings, development partners should champion blended finance mechanisms that de-risk private sector engagement and expand access for low-income users. Within the MSD framework, these tools help bridge financing gaps, stimulate demand, and reinforce supplier viability. These may include; Capped Interest Rate Facility for refugee entrepreneurs that would enable refugee entrepreneurs to access affordable credit while maintaining lender sustainability; Pooled Lending via Savings Groups – where the VSLAs form a pooled lending platform to acquire solar water pumps, and a Carbon-Linked Subsidy Integration
- Support strategic development partners' engagement in policy dialogues with regulators, which will be critical to unlocking enabling environments for inclusive energy and agricultural solutions.

b) Consortium Partners

- Consortium partners should lead the coordination of inclusive outreach and technical capacity building. This involves segmenting awareness campaigns for diverse groups, including VSLA members, youth entrepreneurs, farmer groups and women's collectives, using culturally resonant formats such as radio, drama, and storytelling.
- Partners should also replicate demonstration sites as peer learning hubs and invest in community-based technician training, with a strong focus on gender and refugee inclusion.

- Formalizing MoUs with local authorities and establishing regular coordination forums will ensure alignment, accountability, and shared learning across the consortium.
- Partners should integrate, scale & strengthen the circular economy principles and environmental safeguards into their programming, including setting up e-waste collection centres and battery safety and run public education campaigns on safe disposal.
- Strengthen supply ecosystems: Develop decentralized retail models and mobile inventory systems to reduce stockouts.
- Refine agent engagement frameworks: Standardize stipends, introduce performance benchmarks, and foster peer-to-peer forums.
- Promote integrated solutions: Bundle PUE technologies with clean cookstoves and solar lamps within broader livelihood programming.
- Supporting the formalisation of informal supported groups to unlock access to institutional credit and partnerships.
- **Integrating Climate-Smart Agriculture into Energy Hubs**: Partners should prioritize the integration of Climate-Smart Agriculture (CSA) practices within energy-enabled farming models. This includes linking solar-powered irrigation and climate-resilient crop production to structured market access, cooperative strengthening, and enterprise incubation. By embedding CSA into the broader MSD framework, these interventions reinforce household resilience, improve food security, and create viable pathways for agricultural livelihoods in displacement settings.
- **Advocate for policy dialogue and enforcement on affordable energy finance and taxation:** Project stakeholders, including consortium partners, and energy sector actors, should convene a multi-level policy dialogue that engages both local and central government representatives, financial regulators, and energy access advocates. The objective would be to explore capped interest rates, subsidized lending, blended finance models and regulatory enforcement that can reduce end-user costs without compromising financial sustainability.
- **Advancing Carbon-Relevant Financing for Sustainability**: In Phase 2 of the SUSTAINED project, partners should prioritize tracking emission-reducing technologies, such as clean cookstoves and solar-powered irrigation, for potential carbon credit eligibility. By integrating carbon-relevant financing into the MSD framework, these interventions can unlock new revenue streams, reduce long-term dependency on subsidies, and reinforce environmental sustainability. Establishing systems for monitoring, verification, and reporting will be critical to positioning community-level energy adoption within voluntary carbon markets and climate finance platforms.

c) Energy Service Companies (ESCOs)

- ESCOs play a pivotal role in bridging the last-mile delivery and after-sales support. In Phase 2, they should co-plan outreach calendars with consortium partners to align product availability with community demand and awareness campaigns.
- Establish supplier and community service protocols to enhance warranty literacy and build trust. This should involve partnering with local agents and mobile vendors to expand reach in remote zones, establishing retail footprint and distribution channels, thereby improving last-mile delivery.
- ESCOs should also invest in training more local technicians and refreshening the existing ones to ensure maintenance and repair services are accessible.
- Rollout of the demonstration sites showcasing productive use technologies, such as solar flour mills and irrigation systems, will help convert interest into adoption and foster community ownership.
- Align product offerings with demand: Use market intelligence to adapt technologies to community preferences (e.g., Ecochar vs. Ecowood).
- Adapt product affordability models: Introduce instalment plans, seasonal bundling of PUE packages, and credit scoring models compatible with savings group dynamics.
- Commit to real-time performance data sharing: Participate in joint dashboards to monitor stock levels, demand trends, and customer satisfaction in displacement settings.

d) Financial Service Providers (FSPs)

- FSPs should co-design tailored financial products that reflect the realities of displacement settings. This includes seasonal payment models, instalment plans, and group-based lending mechanisms.
- FSPs must also engage in joint advocacy with development partners and regulators to promote capped interest rates and risk-sharing mechanisms.
- Coordinate with ESCOs: Bundle financing with product demos and supplier engagement to improve uptake.

e) Regulators and Government Stakeholders

- Regulators and government actors are essential in creating an enabling policy environment. In Phase 2, they should support the formalization of community groups and facilitate access to inclusive financing and institutional partnerships.
- Engaging in multi-level policy dialogues with development partners and FSPs to align regulatory frameworks with the needs of the refugee & host communities.
- Regulators should also promote environmental safeguarding by supporting e-waste management infrastructure and enforcing standards for safe disposal.
- Support policy dialogue on affordable energy finance: Support interest rate capping frameworks and incentivize blended finance schemes for off-grid energy technologies.
- Facilitate ESCO participation in public platforms: Ensure energy service providers are actively included in district development planning, sector exhibitions, and national clean energy dialogues.

- Expand and Resource Demonstration Sites as Permanent Learning Hubs: Given their high replication value, demonstration sites should be scaled and resourced beyond initial input provision. LGs should consider allocating strategic land access for scaling solar-powered demonstration farms and co-branded retail hubs.

Conclusion

The SUSTAINED project has demonstrated that integrating PUE and renewable technologies into refugee and host communities is not only feasible but transformative. By leveraging market systems approaches and fostering private sector engagement, the initiative has begun to unlock new livelihood pathways, improve energy access, and reduce environmental degradation in refugee-hosting areas. Key innovations, including solar irrigation, and improved cookstoves, are transforming the economic and social landscape of settlements. However, uptake remains uneven due to affordability constraints, limited awareness, and infrastructural gaps. Addressing these barriers will require sustained investment, targeted subsidies, and policy alignment to achieve practical solutions.

In the future, scaling these solutions will depend on deepening community engagement, strengthening local energy markets, establishing affordable financing models, and embedding gender-responsive strategies that empower women and marginalized groups. The lessons from this foundational phase offer a compelling blueprint for replication and policy influence, positioning Uganda as a regional leader in inclusive energy access for displaced populations.

Figure 5: Tulima Solar demonstrating solar irrigation technologies


Figure 6: Solar Irrigation Equipment Accessories on display