

Lessons From the SUN-ESDS Project

Insights from Ethiopia, Kenya and Uganda

Key Highlight - Ethiopia: User-Centred Design (UCD) of Improved Cookstoves (ICS)

- Dream Stove Development:
 - 14 prototypes made of clay;
 - 3 culturally appropriate & affordable ICS ("Big J") – user approved
- Capacity Building:
 - Training, tools, licenses, sheds, and kiln provided
- **Women-Led Production:**
 - 15 stoves per member per day (4,500/month); 3 USD
 - 862 stoves distributed via UNHCR in 2023, beneficiaries = 6,034 (r)
- High Impact and Adoption:
 - 100% adoption of "Big J" stoves replacing traditional stoves (TSFs)**
 - 21–25% thermal efficiency, reduces fuel use by 30%
 - Cuts firewood trips by ~1 per week



Key Highlight - Ethiopia: Multi-Purpose Energy Kiosks

- A solar-powered Multi-Purpose Energy Kiosk in Nguenyyiel Camp (3 kWp system, 2023)
- Four functional units serving 260–330 customers per day, catchment 40,000 refugees
- Rental model - proceeds planned to support energy access to low-income HHs
- Phone charging is booming (10 ETB/0.18 USD per charge), 50% cheaper than other local providers
- Cinema and cafeteria as vital social hubs offering chilled drinks



Challenges and Lessons Learnt - Ethiopia

Security and Sustainability

Frequent conflicts: disrupted operations - damaged charcoal briquette production centre; rehabilitation ongoing

Multi-Purpose Energy Kiosk: frequent power interruptions impacting other operators due to excess phone charging – growing customer dissatisfaction

Scaling-up of Market-based Solutions

Need for professional support scaling up UCD ICS production hindered by limited resources and capital

Sourcing and transportation barriers: Accessing raw materials (e.g., clay, agricultural waste) has become increasingly difficult and costly

Recommendations - Ethiopia

Formalize Community Agreements

Facilitate agreements between host and refugee communities during early stages of projects to ensure stakeholder alignment and ownership

Expand and Replicate Energy Hubs in Ethiopia

Explore sustainable investment and O&M models

Establish fair energy-use agreements between operators

Scale-up “Big J” Production in Gambella and replicate UCD processes in other settings too

Provide ongoing technical support to cooperatives / local producers; develop pricing strategies to balance user affordability with profitability for business viability

Consider new activities in the biomass value chain

Professionalize roles like sourcing, production, marketing, and distribution to enhance collaboration between refugees and host communities

Key Highlight - Kenya: Policy Development

- Draft Turkana County Energy Policy (2022) & Draft Turkana County Energy Bill
 - Draft Energy Bill is the first in Kenya at county-level
 - Provides clear guidelines for energy development, with prioritization of RE
 - Helps to guide public and private sector players
- County Energy Database & related capacity development



Key Highlights - Kenya

Improved Electricity Access via Mini-Grid Expansion Support

- 45km extension from a MG in Kalobeyei Settlement to nearby villages (80% of costs carried by SUN-ESDS, 20% by operator)
- MG operator reduced connection fees – connections soared
- Increased electricity access (3,000 connections) and improved reliability of supply (catchment of 75,000 people)
 - 31% electricity access rate among HHs; 275 local businesses connected; 20 social institutions connected incl. 3 health clinics
 - Affordable Tariff = ca. 0.28 USD Cents / kWh
- Enterprises have + 4 hours of daily operation
- Doubled monthly revenue
- Demonstrates WTP and ATP for reliable energy services and viability of MGs in the area; operators are planning to further expand MG coverage



Challenges and Lessons Learnt - Kenya

Reliable and Affordable Electricity Access via MGs

Beyond lighting and phone charging, there are signs of growing adoption of higher-tier electricity

Reliable access to electricity is spurring further income-generating opportunities

Enhanced public lighting is reducing incidence of crime and harassment (peaceful coexistence)

Electricity access is fostering more business collaboration between refugees and host communities

Improved health services – new diagnostic services e.g. X-ray

Challenges and Risks for MG Developers

Transition agreements (incl. compensation) in the event of expansion of the national grid into MG locations not well defined, impacting on willingness to invest (business risk for developers)

Ongoing alignment issues between national T&G planning and county-level planning (e.g. MGs, land allocation); several policy bottlenecks encountered

Recommendations- Kenya

Strengthen Investment Approaches & Regulatory Frameworks to Attract Investments

Collaborate with donors and financiers to design effective incentive schemes that attract private sector participation

Introduce asset buyout mechanisms, tariff harmonization, and flexible payment

Adapt a Tailored Approach to MG Development

Capitalize on expansion opportunities for proven MGs and pilot smaller MGs to stimulate consumer demand beyond basic needs like lighting and charging

Align MG initiatives with complementary programs that support financial inclusion for refugees and enhance employment opportunities within host and displaced communities

Key Highlights - Uganda

Solarisation of Health Centres

- Three health centres in Imvepi and Rhino Camp Settlements solarised (3–7 kWp capacity)
- Decreased reliance on diesel generators
- Operational efficiency improvements, especially at night; improved working conditions and higher staff retention
- Expanded capabilities for diagnostics, paediatric care, refrigerated blood storage = blood transfusions, etc.
- Ofua HC III: 80% increase in outpatient services and 90% increase in laboratory caseloads (+ ~100 patients/day post electrification)
- Siripi HC III: doubling of monthly baby deliveries
- HHs report improved satisfaction and trust in services



Key Highlights - Uganda

Market-Based Approaches: RBF Schemes for ICS + solar devices / Energy Kiosks

- Two RBF windows – companies received ca. 20-25% up-front financing
- 3,388 solar product sales via 5 RBF recipients = ca. 23,000 beneficiaries
- Several SHS suppliers introduced PAYGO services to support purchases – initial deposit for customers ca. 38,000 UGX (10 USD)
- Companies offer user-instruction, 2-year warranties / after-sales support
- Adapted Hybrid-RBF outperformed the original RBF, confirming ATP/WTP among r/h
- Target 50r:50h and Eligible Sales Result ca. 40r:60h
- Customers appreciate user friendliness, quality and convenience of new ICS / SHS / SL products.



Challenges and Lessons Learnt - Uganda

Security and Sustainability

- SERP implementation (2 years delay) – unsecured financing
- O&M of SS/IICS in schools and health centres challenged due to improper use (overuse), lack of dedicated O&M budgets, multiple solar systems in institutions via different donors

Scaling-up of Market-based Solutions

- Sustainability of organic demand for RE products, especially because of availability of free ICS products in certain regions
- Scale-up of last-mile solutions for RE suppliers challenged due to transportation and stockpiling bottlenecks – lack of suitable infrastructure close to settlements
- Collaboration with between SHS/ICS suppliers and Energy Kiosks difficult due to their lack of formal incorporation

Recommendations- Uganda

- Scale hybrid RBF models with affordable PAYGO repayment options
- Improve last-mile distribution with affordable transportation (tricycle sharing) and secure warehouses
- Ease Operational Bottlenecks for RE Suppliers
- Support Pooled O&M Funding Systems and Identify Early Funding to Support Policy Implementation Processes
- Increased support to community-based interventions like energy kiosks and e-waste repair - professionalization, formal incorporation, clearly defining ownership structures for new investments and partnerships

