Energy Through Demand-Side Subsidies

Concept Note

Uganda

endev

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Demand-side subsidy pilot – Uganda

Concept note

Abbreviations	
ATP	Ability to pay
CRRF	Comprehensive Refugee Response Framework
DSS	Demand Side Subsidy
EnDev	Energising Development
EASP	World Bank's Electricity Access Scale-up Project
EVH	Extremely Vulnerable Households
EVI	Extremely Vulnerable Individuals
FM	Fund Manager
HTC	higher-tier cooking
ICS	Improved cookstoves
IVA	Independent verification agent
LPG	liquefied petroleum gas
MPI	Multidimensional Poverty Index
NDC	Nationally Determined Contributions
OGS	Off-grid solar
OPM	Office of the Prime Minister
PAYG	Pay-as-you-go
PSFU	Private Sector Foundation Uganda
PSNs	People with Specific Needs
RBF	Results-Based Financing
SHS	Solar home systems
SERP	Sustainable Energy Response Plan for refugees and host communities
UECCC	Uganda Energy Credit Capitalisation Company
UNBS	Uganda National Bureau of Standards
UNHCR	United Nations High Commissioner for Refugees
UGX	Ugandan Shilling
USSD	Unstructured Supplementary Service Data
WB	World Bank
WFP	World Food Programme
WTP	Willingness to pay

1. Context

Uganda is a landlocked country in Eastern Africa with a population of 51 million[1] (3.6 percent annual growth) with the majority living in rural areas. It is also host to 1.9 million[2] refugees. According to Uganda's draft Energy Policy (2020), biomass contributes 88% of the total primary energy consumed within the energy mix through firewood, charcoal, and crop residues with 94% of households relying on biomass to meet their cooking needs. The adoption of higher tier cooking (including LPG, e-cooking devices, ethanol stoves) is slow at approximately 5.3%[3] of the population (mostly realised within urban markets). Within the past ten years, Uganda has witnessed a serious decrease in biomass attributable to population increase (approx. 3% annual growth rate)[4], urbanization (5.6% annually)[5], and low access to clean and energy efficient cooking technologies (approx. 18% of the öpopulation).[6] On the flip side, there has been a remarkable, steady increase in electrification. Access to electricity currently stands at 57% (up from 42 percent in 2020) – 27% of households use solar kits for lighting, 11% use solar home systems, and 19% are grid connected.[7] However, the COVID-19 pandemic has had significant impacts on market indicators that were previously showing positive trends, including market penetration and the purchasing power for clean energy solutions, especially within rural markets and refugee communities[8].

Uganda is globally known for its progressive refugee policies which are guided by the Comprehensive Refugee Response Framework (CRRF). The CRRF calls for social integration of refugees into host communities, freedom of movement for refugees, and the ability to work or compete for local opportunities. Equally on the energy front, Uganda has a strategic vision of reaching universal electricity access by 2040 by adopting the use of modern energy efficient technologies as outlined in the National Energy Policy (2020), National Development Plan III, the Sustainable Energy Response Plan for refugees and host communities (SERP), and Vision 2040. The country has also updated its Nationally Determined Contribution (NDC) to underline the commitment to reduce household carbon footprints through increased electricity access and the adoption of higher tier cooking technologies by rural households (including refugee households) by 2030.

Uganda's off-grid solar (OGS) market is considered mature[9], with a healthy level of competition among OGS companies, a high share of pay-as-you-go (PAYG) sales, and strong quality assurance. However, supportive financing is still required to electrify hard-to-reach regions that do not have commercially viable markets, such as refugee and host communities. Literature suggests that the affordability of off-grid solar solutions is a major impediment in these areas, where the ability to pay is 3 - 4 times lower than the national average.[10]

Despite increased adoption of alternative cooking fuels such as LPG and electric cooking, Uganda's higher tier cooking market is at its pre-commercial phase[11], with limited investments in higher tier cooking technologies and relatively low investment readiness among improved cookstove manufacturers. Stove stacking is a common practice within the country. However, rural markets (including refugee communities) are characterised by an over-dependence on biomass for cooking.

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[1] Uganda Population (2021). https://data.worldbank.org/indicator/SP.POP.TOTL?locations=UG
[2] Uganda Comprehensive Refugee Response Portal (Last updated 31 Jan 2023). https://data.unhcr.org/en/country/uga
[3] Modern Energy Cooking Services (MECS, 2022). https://mecs.org.uk/wp-content/uploads/2022/06/Ugandas-cooking-energy-sector-a-review.pdf
[4] UBOS, 2016. https://www.ubos.org/wp-content/uploads/publications/03_20182016_UNHS_FINAL_REPORT.pdf
[5] World Bank, 2022. https://data.worldbank.org/indicator/SP.URB.GROW?locations=UG
[6] Government of Uganda (2020): *Draft Energy Policy of Uganda*
[7] Uganda Bureau of Statistics (UBOS), 2021
[8] International Labour Organization, 2021. Impact of COVID-19 on Refugee and Host Community Livelihoods.
[9] Off-Grid Solar Market Trends Report 2022: State of the Sector
[10] UOMA, 2020. Reaching unserved refugee markets in Uganda. See section 4.2 for more details on the affordability analysis.
[11] Energy Market Scorecard (EAMD), EnDev https://energypedia.info/wiki/Market_Development_Scorecard

Issues of energy access for refugee populations in Uganda mirror those of host communities,[12] and affordability remains a significant barrier to alleviating energy poverty. Therefore, the demand-side subsidy (DSS) pilot in Uganda delivers demand-side subsidies through the private sector for cookstoves and OGS products to bridge the affordability gap within rural, off-grid markets and displacement settings. The pilot will also provide valuable data and lessons that can be leveraged by the World Bank's Electricity Access Scale-up Project (EASP) and other projects in Uganda.

2. Objective

The objective of the DSS pilot is to bridge the affordability gap for improved cookstoves and off-grid solar products in underserved regions, including refugee hosting settlements and other vulnerable rural locations. This pilot aims to provide[13]:

- Access to off-grid solar products to about 62.300 people in eligible locations.
- Access to improved cookstoves to about 73.300 people in eligible locations.
- Access to higher tier clean cooking products to about 34.400 people in eligible locations.
- A model for targeted demand-side subsidies that can be adapted and scaled by the Government of Uganda, e.g., through the World Bank supported EASP.

3. Beneficiary targeting

3.1 Target population

The focus of the pilot is on refugees and host communities

Region	Sub-Region	Hosting District	Hosting District Population	Refugee Gazetted Areas	Sub-Counties Hosting Refugees	Refugee population	Approx. 45% household market size
Western Uganda	Bunyoro Sub-region	Kiryandongo	313,800	Kiryandongo	Bweyale TC, Kigumba TC, Kiryandongo, Kiryandongo R/S, Kiryandongo TC	64,362	32380
	Toro sub region	Kyegegwa	501,120	Kyaka II	Mpara,Ruyonza, Kyegegwa	90,021	50888
		Kamwenge	337,167	Rwamwanja	Nkoma,Bwizi, NkomaKatalyeba,Bihanga, Biguli	43,456	33139
Northern Uganda	West Nile Sub-region	Yumbe	663,600	Bidibidi	Ariwa, Kochi, Kululu, Odravu, Romogi	210,102	73231
		Terego	233,300	Rhino Camp, Imvepi	Odupi, Omugo, Uriama	143,200	30203
		Madi-okollo	164,200	Rhino Camp	Rigbo	62,874	18820
		Obongi	49,100	Palorinya	Itula	120,397	12159

[12] Sustainable Energy Response Plan for Refugees and Host Communities (SERP, 2022).
[13] The target beneficiaries have been calculated based on market insights on affordability gap. The subsidy level which directly influences the target beneficiary numbers is to be harmonised with the WB EASP in order to get the exact project beneficiaries.

		Adjumani	235,900	Adjumani	Dzaipi, Itirikwa, Ofua, Okusijoni, Pachara, Pakele	220,592	35412
		Koboko	258,000	Lobule*	Koboko TC, Lobule	5,899	23599
	Acholi Sub-region	Lamwo	143,800	Palabek	Palabek Kal, Palabek Ogili, Palabek Gem	76,869	17884

Sources: UNHCR 2020, UBOS 2019

Assumptions:

i. The host community household size is approximately 5 members.
ii. The refugee household size is approximately 7 members.
iii. The targeted market size is assumed to be 45% for both clean cooking and lighting based on a conservative assumption.

Refugee and host communities

UNHCR Uganda reports that 92% of refugees in the country are integrated within rural host communities. To strengthen Uganda's progressive refugee approach, humanitarian support and aid is directed to improve the livelihoods of both refugee and host communities. Both groups receive support through livelihood, WASH, health and education programmes, while only refugees benefit from cash and food assistance programmes. However, despite the tremendous advances in poverty reduction through livelihood programmes, only 29% of refugees in Uganda are actively working compared to 64% of host communities[14].
Table 1 below indicates the World Food Programme (WFP) and UNHCR Uganda (2017) benchmark system for selecting refugees for monthly food assistance and cash transfers [15]. However, due to dwindling funds within the humanitarian landscape, food assistance and cash transfers were already reduced on two occasions (i.e., 2012 and 2015) due to an influx of refugees. Such reductions have forced many households to prioritise food, health care, and education over clean energy, and led humanitarian organisations to increasingly focus their support on People with Specific Needs (PSNs) and/or Extremely Vulnerable Individuals (EVIs) within Extremely Vulnerable Households (EVH).

Table 1. General humanitarian food and cash prioritization for refugees in Uganda (UNHCR & WFP, 2017)

Target group	Eligibility criteria	Food	kg	Cash (UGX)
EVI	Vulnerability assessment (see Section 4)	Cereal (in flour) Pulses/MG Pulses/MM Veg Oil CSB (Corn-Soy Blend) Salt	11.7 2.4 2.1 0.9 1.5 0.15	45,000
Asylum seekers (100% food assistance)	Registered as asylum seeker	Cereal Pulses/MG Pulses/MM Veg Oil CSB (Corn-Soy Blend)	12 2.4 2.1 0.9 1.5	n/a
New Case New (100%)	Registered with arrival date after July 2015	Cereal Pulses/MG Pulses/MM Veg Oil	12 2.4 2.1 0.9	31,000

[14] UNHCR, 2021. Uganda – Knowledge Brief. https://www.unhcr.org/5fe31b2b4.pdf
[15] WFP and UNHCR, 2020. Analysis of Refugee Vulnerability in Uganda.

		CSB (Corn-Soy Blend)	1.5	
New Case Old (50%)	Registered with arrival date between July 2012 and June 2015	Cereal Pulses/MG Veg Oil CSB (Corn-Soy Blend)	6 1.2 0.45 1.5	17,000
Old Case (25%)	Registered with arrival date before June 2012	Cereal Pulses/MG Veg Oil CSB (Corn-Soy Blend)	3 0.6 0.45 0.75	8,500
No entitlement	Registered with arrival date before June 2012			

Other last-mile rural areas

In addition, the pilot includes other last-mile rural areas with affordability constraints given high poverty levels as indicted by the Poverty Status Report (2021) and Multidimensional Poverty Index (MPI) of Uganda (UBOS, 2022). Both reports indicate that the Northern Region remains the epicentre of poverty in the country with 35.9% of the population living in poverty (as of 2019/20). Poverty levels in the north have increased largely due to a reliance on subsistence economy, which makes households more susceptible to financial shocks. Beyond this, the region has historically experienced numerous shocks spanning the adverse aftermath of rebel activity (i.e., LRA movement, 1988 – 2006), cattle raiding, a continuous influx of refugees, and climate change impacts (i.e., rising temperatures), which are compounded by deforestation due to the overdependence on biomass for cooking.

The last-mile, rural areas eligible within the pilot include: Amuru, Maracha, Nebbi, Nwoya, Pakwach, Zombo, Kitgum, Omoro, and Moyo.

3.2 Targeting mechanism

Geographic targeting based primarily on **demographic data** from gazetted refugee hosting districts and poverty status indicators (as described in Section 3.1 above) is used to identify eligible beneficiaries. The multi-dimensional poverty index and poverty status indicators are used to select particularly vulnerable refugee hosting areas at the sub-county level. Demographic targeting methods are used to target additional poor and underserved, poor rural locations (see 3.1(ii)). Within the refugee host districts, the pilot aims for a 50/50 split[16] between refugees and host community[17] members for off-grid solar (OGS) products an improved cookstoves (ICS). Higher-tier cookstoves (HTC) are exempt from the sales ratio.

The DSS pilot builds on a “blended” (supply and demand-side) RBF[18] test that was implemented by Energising Development (EnDev)’s refugee component. The DSS pilot will build on EnDev’s previous experience and expand further into refugee settlements and their host communities (see table 2 below).

Table 2. Population of some of the DSS target refugee settlements and their host districts

Region	Sub-Region	Hosting District	Hosting District Population	Refugee Gazetted Areas	Sub-Counties Hosting Refugees	Refugee population	Approx. 45% household

[16] 50/50 split is the ideal situation and in alignment with UNHCR resource allocation however under a market situation a 40/60 split might be achievable.
[17] Funding guidance under the SERP policy framework.
[18] The test/learning RBF facility was designed with limited resources and a small target of 1,000 households. The purpose of the test pilot was to gather information on refugee market response/stimulation to demand-side subsidies within a few villages in Imvepi and Rhino Camp refugee settlements.

							market size[19]
Western Uganda	Bunyoro Sub-region	Kiryandongo	313,800	Kiryandongo	Bweyale TC, Kigumba TC, Kiryandongo, Kiryandongo R/S, Kiryandongo TC	64,362	32380
	Toro sub region	Kyegegwa	501,120	Kyaka II	Mpara,Ruyonza, Kyegegwa	90,021	50888
		Kamwenge	337,167	Rwamwanja	Nkoma,Bwizi, NkomaKatalyeba,Bihanga, Biguli	43,456	33139
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Sources: UNHCR 2020, UBOS 2019

Assumptions:

iv. The host community household size is approximately 5 members.
v. The refugee household size is approximately 7 members.
vi. The targeted market size is assumed to be 45% for both clean cooking and lighting based on a conservative assumption.

4. Affordability gap and subsidy level

4.1 Eligible products

EnDev identifies and selects technologies based on need, scalability, and context. The DSS pilot for Uganda supports:

- cooking products ranging from tier 1 to 5 of the Multi-tier Framework for clean cooking access[20] (incl. improved cookstoves of various sizes, ethanol stoves, electric cookers - only in areas with access to recently installed mini grids), and
- tier 1 off-grid solar products of the Multi-tier Framework for electricity access[21] (incl. lanterns with phone charging and solar home systems).

[19] Approximate market size is given by (45%*((Hosting District Population divided by 5) + (Refugee Population divided by 7)))

[20] https://www.esmap.org/mtf_multi-tier_framework_for_energy_access
[21] https://mtfenergyaccess.esmap.org/methodology/electricity

Beneficiaries are eligible to receive one subsidised product per technology (i.e., cooking and/or solar), which is ensured through an eligibility check at the point of sale and during verification. Support for different tiers of eligible products allows beneficiaries to select products in line with their affordability and product preferences.

All eligible technologies must be certified by the Uganda National Bureau of Standards (UNBS) and/or have a Verasol certification. Table 3 and

Table 4 provide an overview of the categories of eligible quality-certified products available in Uganda (incl. illustrative products and pricing), for reference.

Table 3: Reference cooking products

Product category	Tier 1-2 Improved cookstoves (ICS)[22]	Tier 3 ICS	Tier 4 Ethanol Stove	Tier 4 Electric Pressure Cooker
Illustrative product reference	Smart Home 	ACE One 	Bio-stove 	lectric Pressure Cooke 
Fuel Source	Wood/ Charcoal / Briquettes/ Pellets	Wood/ Charcoal / Pellets	Ethanol	Electricity (mini grid)
*Approx. Average Fuel Price (UGX.) / day	3,000 /kg sized bag (i.e., charcoal only)	-	1,250 /litre	1,000 per kWh (*mini-grid tariff)
Average Heat Combustion content	<30 MJ/kg (i.e., charcoal[23])	<16 MJ/kg (i.e., dry firewood)	29.67 MJ/kg	
Cash price Market ranges (UGX) (*Including other similar alternative products*)	14,000 – 40,000 (range of various sizes 0 – 4)	400,000 – 480,000	270,000 – 300,000	280,000 – 320,000
PAYG price, deposit + monthly instalments (UGX)	n/a	80,000 + 10 x 40,000 (480,000)*	n/a	n/a

Sources: Private sector companies. Notes: *Approx. Average Fuel Price (UGX.) per day may increase or decrease depending on the daily cooking demand for each household. ACE One stove prices are expected to drop in Q1 of 2023 as EnDev supported the company to install a production line in-country.

[22] At least compliant with class 3 regarding thermal efficiency under the UNBS standard (US 761:2019, Biomass Cookstove Requirements)
[23] Carbonization of firewood into charcoal also requires energy of 60 to 180 MJ which is lost in the conversion process while producing 1 kg of charcoal with a specific energy content of 30 MJ/kg (https://energypedia.info/wiki/Cooking_with_Charcoal)

Table 4: Reference OGS products

Product category	Tier 1 Lantern	Tier 1 Lantern + phone charging + Radio	Tier 1 Solar home systems (SHS)[24]
Illustrative product reference	Niwa Multi 300 XL 	D.light T200R 	Engie MySol 10W 2 
PV module maximum power (W)	3	4.2	10
# Light points	1	1	2
Total lighting service (lm-hours/solar-day)	960	1,100	Not tested
Available daily energy (Wh/day)	6	8	22
Cash price Market ranges (UGX) (*Including other similar alternative products*)	90,000 – 130,000	110,000 – 150,000	449,000 – 700,000
PAYG price, deposit + monthly instalments (UGX)	n/a	n/a	39,000 + 12 x 42,750 (552,000)*

Sources: Verasol, OGS companies. Notes: *Engie typically provides this product with a tenor of 33 months at monthly payments of UGX 18,000. This price corresponds to an anticipated payment schedule of 12 months, which is better suited to refugee settlements. However, there are also other existent competitive pricing and payment schemes offered by other market actors that may push PAYG prices to be within the range of UGX. 400,000 – 700,000.

4.2 Affordability gap

Refugee households spend on average 22% of their income on energy according to an UNHCR estimate.[25] A study by EnDev suggests that the average income of a refugee household in rural areas / settlements could range from UGX 72,000 - 114,700 per month.[26] This would translate to energy expenditures of UGX 15,840 - 25,234 per month for cooking, lighting, and other services. Assuming an equal share between cooking and electricity needs, we estimate the ability to pay for each product category to be within the range of UGX 7,920 – 12,617.

However, Mercy Corps' recent pilot in the Bidibidi refugee settlement suggests that the data above only represents energy expenditures by wealthier households within the refugee and host communities[27]. For this reason, the lower threshold of the average expenditure range (i.e., UGX 7,920 per month) together with the willingness to pay estimates have been considered for both ICS and solar products. The higher threshold of the average expenditure

[24] Tier 1 SHS are typically sold on PAYG/credit.
[25] UNHCR, Uganda Country Refugee Response Plan January 2019 —December 2020, Link
[26] Energising Development (EnDev) Uganda GIZ-PREEEP-June 2017, A Rapid Assessment of Energy Needs and Practices in Refugee Settlements in West Nile, Link.
[27] Mercy Corps, 2021. One Year On: Paying for Darkness, link. Better-off households who were able to afford PAYG SHS during their pilot at subsidised monthly rates between UGX 8,781 and 11,515 were engaged in farming and MSMEs. The more vulnerable groups in the Mercy Corps pilot were targeted for sub-tier 1 off-grid solar products, i.e., lanterns with or without phone charging.

range (i.e., UGX 12,617 per month) has been considered for the adoption of higher tier clean cooking technologies.

Other insights from the Mercy Corps pilot indicate that refugees and host communities need an average lead time of 3 months or less to secure a cash deposit for tier 1 PAYG solar systems and people are willing to take on 12-month loans to pay for credit-enabled products.

Finally, a willingness-to-pay (WTP) field survey conducted by EnDev in three refugee settlements (Bidibidi, Kiryandongo, Rhino Camp)[28] suggests that, on average, the refugee and host population is generally willing to pay UGX 60,000 – 80,000 for tier 1 lanterns with phone charging, and UGX 260,000 – 300,000 for tier 1 SHS (latter only looks at systems with PAYG prices), and between UGX 7,500 – 19,000 below the retail price for different sizes of improved cook stoves. This information, along with an estimate of the affordability gap, is summarised in the table below.

[28] EnDev, 2022. Energy Affordability Gap: Data Scoping for Bidibidi, Imvepi and Rhino Camp refugee settlements.

Table 5: Affordability estimates for cook stove products

Product category	Tier –1 -2 ICS[29] (Size 0 – 4)	Tier 3 ICS	Ethanol Stove (Tier 4)	Electric Cookers (Tier 4)
Reference product	Smart Home **(Size 1) ***	Ace One	Bio-stove	EPC
Price reference (UGX)	19,000	480,000 (Initial deposit of 80,000 & Credit, 10 months) 40,000 monthly	300,000	320,000
Ability to pay (UGX), per income and expenditure data from literature	15,840 (cash). Corresponds to 2 months' low-end cooking expenditure range*.	*Currently no data available, to be evaluated further as part of the project*		
Willingness to pay (UGX), per EnDev survey (approx.)	9,000 (cash) Avg. UGX. 10,000 less than retail price for all stove sizes 0 – 4.	28,000 per month (Instalment) Corresponds to approx. 2 months high-end cooking expenditure range*	100,000 (cash). Corresponds to high-end cooking expenditure range*.	120,000 (cash) Corresponds to high-end cooking expenditure range*.
Affordability gap (UGX), average of price minus WTP for ICS and tier 3 & 4. (approx.)	10,000 (53% of cash price for only Size 1 ICS) 26 - 67% of cash price for Size 0 - 4	200,000 (42% of credit price)	200,000 (67% of cash price)	200,000 (63% of cash price)

Note: Size 4 ICS is primarily consumed by extended families as well as smaller home-based restaurants.

Note: ATP for higher tier cooking is complemented by access to other revenue streams such as SACCOs and micro-loans, beyond the primary income. WTP for higher tier cooking (HTC) has been calculated based on main suppliers' feedback on customer preferences and sales performance (within the target markets). A small target population (<6,000 sales) is to be considered for HTC technologies. This shall provide a data-driven learning pilot into the market penetration of HTC within the target locations.

[29] At least compliant with class 3 regarding thermal efficiency under the UNBS standard (US 761:2019, Biomass Cookstove Requirements)

Table 6: Affordability estimates for OGS

Product category	Lantern	Tier 1 Lantern + phone charging	Tier 1 SHS
Reference product	S200	Niwa Multi 300 XL	MySol 10W 2
Price reference (UGX)	65,000 (cash)	130,000 (cash)	552,000 (PAYG, 12 months) 39,000 initial payments 42,750 monthly
Ability to pay (UGX), per income and expenditure data from literature	23,760 (cash). Corresponds to 3 months of lighting expenditure (lower end of the range)*	41,085 (cash). Corresponds to 3 months' lighting expenditure (average of the range)*.	13,695 per month (PAYG, 12 months). Corresponds to monthly lighting expenditure (average of the range)*.
Willingness to pay (UGX), per EnDev survey	30,000 (cash) (46% of cash price)	50,000 (cash) (46% of cash price)	180,000 (PAYG, 12 months) (32% of PAYG price)
Affordability gap (UGX), highest of price minus WTP (approx.)	41,240 (63% of cash price)	80,000 (62% of cash price)	11,000 per month (67% of monthly instalments and 24,000 initial payment)

Sources: EnDev, UNHCR, Mercy Corps, OGS companies in Uganda. *refers to the UGX 7,920-19,470 expenditure range mentioned in the text.

4.3 Calculation and adjustment of subsidy level

One subsidy level is set for each product category to match the affordability gap. Based on the reference products for each tier and technology, a price cap[30] (maximum subsidy amount) has been defined given the WTP and ATP. The maximum subsidy amounts are calculated based on the affordability gap section in Table 5 and Table 6 above. For products sold on cash, the maximum subsidy range is 25 – 67 % for cooking technologies and 27 – 65 % of solar technologies based on multi-tier levels. For products sold on instalment basis and/or PAYG, the demand-side subsidy helps to reduce the initial deposit as well as the monthly instalment amount. The subsidy amounts and design are further refined in the operations manual and adjusted during the implementation phase.

Considering previous lessons learned of EnDev projects, the subsidy level within refugee and host communities is the same for both target groups to avoid social tensions.

5. Subsidy delivery

5.1 Delivery channel

EnDev uses a results-based financing (RBF) approach to provide DSS. Subsidies are delivered through participating cookstove and solar companies as end-user price reductions for eligible products. Payments are released after the verification of eligible sales.

[30] Subsidy price caps for each technology shall be set in the projects operations manual based on the approximated affordability gap (UGX) (highest of price minus ATP or WTP) seen in **Table 5** and **Table 6**.

EnDev has partnered with the Private Sector Foundation (PSFU) that serves as the Fund Manager (FM) to conduct the company application process, contract the companies, handle incentive disbursements, and coordinate the submission of sales reports to EnDev as well as support companies in the day-to-day aspects of the project.

The identification and selection of the participating companies for the RBF is based on a public tendering process. The initial Call for Applications started in late January 2024 and concluded February 2024. Following strong performance – where most solar companies achieved their targets before the end of 2024 – additional budget was allocated between July and August 2024 for re-contracting. Furthermore, in early 2025, a separate Call for Applications was launched specifically for cooking companies to accelerate ICS sales.

Key selection criteria besides commercial and legal requirements include e.g.

- Experience in the distribution, retail sales and after-sales service of cook stove and OGS products within Uganda or East Africa, preferably in hard-to-reach areas.
- Financial capacity to handle working capital requirements.
- A strong technical proposal using existing networks or setting up new networks to reach and serve the locations identified for this project.
- Competitive pricing for eligible cookstoves and OGS products.

The pilot also coordinate with other EnDev activities and partners to provide complementary supply- and demand-side support, such as awareness raising campaigns, logistical support, supply-side RBFs, and credit facilities. Therefore, the government's EASP, funded by the World Bank and coordinated by the Uganda Energy Credit Capitalisation Company (UECCC), is a key project partner.

5.2 Subsidy disbursement

The FM delivers the subsidy directly to the selected cookstove and OGS companies for every eligible, independently verified sale supported by the pilot. Disbursements are based on milestones, following the proposed tentative schedule below:

Disbursement	Terms and conditions
Advance payment	Up to 30% based on the individual contract value of the company. In addition, companies need to justify why they do not have sufficient means to meet working capital requirements for the pilot project.
Upon verified sales	70% of the subsidy (100% in case there is no advance disbursement)

6. Verification and monitoring

To support the verification of sales, EnDev utilises an online data platform – KOBO Toolbox – to assist with the identification of eligible customers, facilitate data collection, and allow for real-time monitoring. The platform allows agents from participating companies to check a potential customer's eligibility[31] and enter eligible sales directly, without need for internet.

Detailed sales reports are used to supplement the initial validation of eligible customers through the KOBO platform. In these reports, companies are also required to submit a list of eligible customers that encountered technical issues and how these were addressed, as well as a list of customers with active PAYG plans (including prices the systems were purchased at). These are considered during the verification process, and any reported customer complaints or service issues filed under the verification process for follow-up by the company.

An independent verification agent (IVA) checks RBF claims made by participating cookstove and OGS companies. The verification consists of four steps (see Table 7; see EnDev RBF Verification Product for more details) and is conducted in line with Uganda's and GIZ's data projection rules.

Table 7: Sales verification procedure

Steps	Description	Sample size
Step 1: Data consistency and Paper-trail Check	The verification process begins with a data consistency check of data provided by EnDev to the IVA.[32] This check includes screening for redundancy, duplicates, blank records, incompleteness, bulk sales, and contradictory entries. At this stage, the IVA also visits the company's premises to carry out spot checks and ensure that reported sales (digital records) match physical receipts.	100% of data consistency check. Spot checks for paper trail
Step 2: Phone verification	For steps 2 and 3, a sample is taken using a statistical sample size calculation and sampling methods. Phone verification is conducted for 90% of that sample. In this step, the IVA remotely contacts and interviews customers following an agreed standard questionnaire.	90% of representative sample
Step 3: Field verification	The IVA physically verifies the presence of the cookstove or OGS product at the customer's residence and can directly observe the quality of energy access products or services as well as compliance with eligibility requirements.	10% of representative sample
Step 4: Validation of results	The final verification report is presented to the company. This step allows participating companies to check the verification results, allowing for greater transparency and building trust in the verification.	n/a

[31] Customer eligibility will be checked automatically through the system – and based on whether the customer is a pervious beneficiary or not.
[32] GIZ processes personal data exclusively in accordance with the EU General Data Protection Regulation (GDPR) and the German Federal Data Protection Act (Bundesdatenschutzgesetz, BDSG)

The project operations manual describes the additional verification parameters as well as the sampling methodology in more detail. Digital tools are used to capture verification results and enhance data quality.

EnDev Uganda also monitors retail price changes of products being offered by participating companies within commercial markets near the target locations and in more distant locations. This provides an early warning system in case of market distortion. Price checks are conducted randomly through market visits on a quarterly or bi-annual basis.

7. Communication & Awareness

Communication and awareness are crucial for the success of the DSS pilot. A communications and awareness raising plan details the aims of:

- Ensuring visibility of key project data and achievements in line with donor requirements.
- Promoting ownership and buy-in of key stakeholders.
- Increasing awareness of the pilot as well as on renewable energy technologies and their benefits more generally.

To maintain effective outreach, EnDev supports market activation activities through its partners. Various communication channels (including local leaders, participating companies, etc.) are utilized to facilitate awareness raising. This also includes leveraging special events/days such as the world refugee day, women's day, environment day, month of cooking, energy week, market days and weekends to optimise outreach efforts.

To this end, an external communication agency is contracted to train sales agents on effective techniques, as well as conduct extensive awareness raising on the program and supported products within the target communities. These awareness raising drives are particularly crucial for driving ICS sales.

EnDev collaborates closely with the World Bank's EASP, UECCC, and other sector actors in the design, implementation, and exit of the DSS pilot. This includes a project kick-off meeting, onboarding of partners, and participation in market awareness campaigns needed to encourage behavioural change and increase the adoption of higher tier cooking solutions and lighting technologies. A collaborative working group among sector partners aims for knowledge sharing, harmonisation of subsidy designs and communication strategies or messages (including gender-sensitive communication) for higher impact.

8. Risk mitigation

Risk	Probability	Potential impact	Mitigation measures
Subsidy leakage into commercial markets from geographical targeting	Medium	High	Phased targeting based on sub-counties, regular monitoring of market prices within commercial markets, customer eligibility checks, and continued verification as well as clear communication on sales conditions (i.e., not resale) and potential consequences of violation.
Incentives benefiting unintended buyers	Low	Medium	Demographic and geographic targeting, eligibility checks using unique identifiers, and clear communication regarding eligibility criteria as well as sales conditions and potential consequences in case of violation.
Funding of unsustainable companies or business models leading to company failure after end of pilot	Medium	High	Competitive tendering of companies with their selection based on business maturity.
Unintended communication of wrong market price signals	Medium	High	Harmonisation of communication with all involved stakeholders (including customers i.e., constant mention of a discount on eligible products).
Misappropriation of funds by participating companies / fund manager	Low	High	External audit of the fund manager (incl. Commercial suitability check prior to contracting), spot check on activities implemented by consultants/ fund manager/ RBF partners, and verification of sales.

9. Key implementation stakeholders

9.1 Roles and responsibilities

EnDev Uganda provides overall coordination of the DSS pilot. This includes providing support in the design of the RBF under the EASP, contracting & coordination of the FM as well as other service providers, ensuring stakeholders are informed and engaged as well as contributing to the global end-user subsidy knowledge exchange. The key project stakeholders include:

9.1.1 Ministry of Energy and Mineral Development

MEMD, the political partner of EnDev and line ministry mandated to represent the Government of Uganda in energy related topics, guides the design process and provide the enabling environment for the implementation of the DSS pilot. As a key stakeholder, under the Electricity Access Scale-up Project (EASP), MEMD also supports communications and awareness raising through its structures.

9.1.2 Office of the Prime Minister (OPM)

Mandated to lead and enhance the national response for refugee emergency management, OPM oversees the reception, granting of refugee/asylum seeker status, settling and protection of refugees, as well as infrastructure development and livelihood enhancement for refugees. The Office also advises government on refugee matters in accordance with both international and national legal frameworks. The OPM equally provides the enabling environment for the implementation of the DSS.

9.1.3 The World Bank (WB)

The WB is currently funding and supporting the government's Electricity Access Scale-up Project (EASP), including a significant component targeting refugee settlements with technical and financial mechanisms enabling acceleration in access of clean energy solutions country wide.

More precisely, the role of the WB in this pilot is:

- To provide technical support during the design of the pilot project
- Support in the general coordination of partners under the EASP during implementation.
- Integrate lessons-learned to support scale-up of the pilot through the EASP.

9.1.4 UN Agencies (UNHCR and WFP)

Guided by their frameworks and mandates, UNHCR and WFP have been supporting the refugee response in Uganda for over two decades. EnDev Uganda continues its collaboration with these agencies to learn and/or share knowledge on delivery mechanisms that can accelerate energy access through market-based approaches and DSS in humanitarian contexts.

9.1.5 Fund Manager

EnDev has partnered with PSFU, Uganda's appex body for the private sector, to facilitate the execution of the project Operations Manual by supporting the mobilization of companies,

contracting eligible companies, managing incentive disbursements, and the coordinating the collection of sales data for EnDev.

9.1.6 Uganda Energy Credit Capitalisation Company (UECCC)

UECCC is the fund manager of the GoU's EASP. UECCC facilitates the provision of a concessionary working capital facility and manages an RBF facility with both supply side and demand side subsidies to selected cookstove and OGS companies (incl. enabling access to finance to productive use appliances (PuE)). EnDev leverages its subsidy and sector knowledge to provide technical support to UECCC (incl. harmonising communication messages and subsidy structures) during the implementation of DSS and EASP.

9.1.7 Independent Verification Agent

The IVA supports the pilot in verifying sales reported by participating companies using prescribed verification process and tools (see section 6).

9.2 Coordination and stakeholder engagement

Since the coordination and alignment of activities is crucial to the success of the project, EnDev continues its collaboration with sector networks and other stakeholders such as the Clean Cooking Alliance, Mercy Corps, Global Off-Grid Lighting Association, local associations, private sector companies, and sector-specific working groups, such as the End-User Subsidy Lab, the National Renewable Energy Platform, the refugee response Working Group on Energy and Environment ('WorkGrEEn'), and the UNHCR and WFP Cash Working Group. These networks and platforms are used for coordination, learning, and knowledge sharing.

Further partners for example relating to awareness generation will be contracted & onboarded by EnDev along the project implementation to enhance the project results.

10. Exit strategy

10.1 Scale-up

It is envisaged that a successful pilot will be scaled through a government fund with support from the World Bank. To facilitate this scale-up, EnDev established a working group and held regular meetings with the World Bank and the Government of Uganda. These exchanges ensured that EnDev's subsidy levels have been fully aligned with the national Electricity Access Scale-up Project (EASP), which includes a DSS component for refugee settlements. Furthermore, key DSS lessons have been shared and integrated into the WB-funded national program implementation.

10.2 Phase out

In case a scale-up through the Government of Uganda and WB as described above is not possible, the project will aim to facilitate a smooth phase out at the end of the project period. Potential phase out measures may include the use of specific language (i.e., "discount" instead of "subsidy", "limited time", etc.) in communication materials from the start, and clear communication to all involved stakeholders ahead of the phase out. Where feasible, individual project outcomes, developed tools or materials will be captured and handed over to local partners for continued use after the end of the project.

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