SAFE ACCESS TO FUELS AND ENERGY STRATEGY, 2016-2020

UNHCR UGANDA

2016

ACRONYMS

AGD	Age, Gender and Diversity
CDM	Clean Development Mechanism
CEAP	Community Environment Action Plan
GACC	Global Alliance on Clean Cookstoves
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale
GVEP	Global Village Energy Partnerships
Ha	Hectare
HH	Household
KII	Key Informant Interview
KWh	Kilo Watt hours
LPG	Liquefied Petroleum Gas
MEMD	Ministry of Energy and Mineral Development
MW	Mega Watts
NAMA	Nationally Appropriate Mitigation Actions
NDP	National Development Plan
NEMA	National Environment Management Authority
OPM	Office of the Prime Minister
PV	Photo Voltaic
ReHoPE	Refugee Host Population Empowerment
SAFE	Safe Access to Fuels and Energy
SGBV	Sexual and Gender-Based Violence
STA	Settlement Transformative Agenda
tCO2e	Tonne of carbon dioxide emitted equivalent
UNDAF	United Nations Development Assistance Framework
UNHCR	United Nations High Commissioner for Refugees
WHO	World Health Organization

EXECUTIVE SUMMARY

Uganda is host to about a half a million refugees mostly from South Sudan, Democratic Republic of the Congo, Somalia and Burundi. Access to energy is a basic need; however, to the refugees access to energy is a real challenge. Therefore, in order for refugees and persons of concern to meet their energy needs in a sustainable and safe manner, the United Nations High Commission for Refugees (UNHCR) developed its first global strategy for Safe Access to Fuel and Energy (SAFE) in 2014. Uganda has likewise followed suit by formulating its own country SAFE strategy in consultation with various stakeholders (refugees, host communities, government, private sector, implementing partners and other humanitarian actors). The Uganda SAFE strategy aims to improve the protection of refugees and welfare of both refugees and host communities by integrating energy issues in all the phases of refugee operations (emergency, care and maintenance, and durable solutions).

It is noteworthy to mention that unlike other countries that have camp-based model, Uganda operates a settlement model where refugees are integrated with the host communities and have freedom to work and move within the country. Some of the refugee settlements in Uganda e.g. Nakivale have been operational since 1959. These settlements have hosted refugees for many years and consequently, and over time have suffered and are still suffering from environmental degradation. Most important is deforestation which has led to very acute shortage of fuelwood in and around the settlements.

Despite numerous energy access interventions, results from the rapid assessments conducted by UNHCR Uganda in August, 2015 revealed that 97 percent of refugees use firewood for cooking and yet have to walk a distance of 4-10 km to access firewood. This has resulted in refugees undercooking and skipping meals, while others sell some food rations to buy firewood, thus affecting their nutritional status. Women and girls, who mostly collect firewood, have also suffered from SGBV in the form of assaults, rape, attempted rape and defilement among others. These are serious protection issues which have become a cause of tension between the refugees and host communities.

The situation has been exacerbated by use of inefficient open fires and three stone stoves by 65 percent of refugee households. In addition, cooking is done in poorly ventilated kitchens which cause indoor air pollution and predisposing refugees to health conditions such as respiratory infections. For domestic lighting, a majority of households use firewood, dry cell battery and phone torches, while about 5 percent use solar. For public places, there is at least 30 percent coverage of solar street lighting. However, there is widespread vandalism of street lights.

In light of the above, the overall goal of UNHCR Uganda SAFE strategy is to improve the protection, welfare and well-being of refugees and other persons of concern and with the following four objectives: i) Improved household access to fuel-efficient technologies and renewable energy; ii) improved access to fuel-efficient technologies and renewable energy at institutions within and around settlements; iii) Community-based management of woodlots and multi-purpose plantations for fuel, livelihoods improvement and environmental protection; iv) and the integration of energy requirements into emergency preparedness and response plans.

The six overarching principles of this strategy include: protection; equity; access; sustainability; community empowerment; and appropriateness and reliability. This strategy will be implemented by in partnership and collaboration with OPM department of refugees whose mandate is “to manage the response to refugees in Uganda by assuring the welfare and protection within the framework of national policy, international laws and standards, while safeguarding the local and national interests.” Furthermore, strategic partnerships will be established with the traditional donors, UN agencies, academic, research, and financial institutions. For a wider appeal, this strategy has been aligned with various government and institutional frameworks such as the NDP II (2015/16-2020/21), National Forest Plan (2011/12-2021/22), Vison 2040, UNDAF, STA and ReHoPE among others. To successfully and effectively implement this strategy, about US$ 20 million is required.

Table of Contents

1.0 BACKGROUND

Uganda has been hosting refugees since 1959 and currently, hosts almost a half million refugees. For these vulnerable populations, access to household energy and fuel for cooking, lighting, heating, as well as for powering health centres, schools, water pumps, administration compounds and street lighting, is a critical issue. Access to energy is a basic human need; for refugees however, such access is at times a real challenge. Currently, 97 percent of refugees in Uganda (UNHCR Uganda Energy and Environment Community Assessments, 2015) lack adequate access to safe, clean and sustainable energy. UNHCR Uganda spends about US$130,000 annually for pumping water using diesel generators in the refugee settlements.

Despite many former energy access initiatives – mainly focused on the distribution of clean cookstoves, solar lanterns, solar street lights and tree planting – little success has been sustained in improving the energy situation as shown in Box 1. Consequently, 99 percent of refugees still rely on traditional biomass for cooking while for lighting, 45 percent use alkaline battery torches, 14 percent firewood, 13 percent kerosene and 10 percent use candles (UNHCR Uganda Energy and Environment Community Assessments, 2015).

Box 1: Identified Constraints Facing Sustainable Energy Use and Management in and around settlements include:

- energy issues are not prioritised in contingency plans;
- poor awareness and knowledge of energy saving stoves and the environment;
- poor adoption of improved stoves due to design aspects, culture and traditions of refugees;
- vandalism of solar street lights;
- lack of clean, alternative means of cooking and lighting;
- limited plot sizes (30-50m^2)
- low survival of trees due to damage and lack of aftercare;
- lack of clear ownership of established woodlots;
- no immediate benefits of tree planting realized;
- weak implementation of natural resource management by-laws;
- dysfunctional local environment committees; and
- high cost of renewable energy technologies.

Source: UNHCR Uganda energy and environment assessments, 2015

Failure to provide safe and reliable access to energy has direct implications on the environment as well as on peoples' health, livelihoods and well-being. The inefficient burning of biomass using open fires or inefficient cooking practices such as three-stone fires in poorly ventilated kitchens/spaces,

results in indoor air pollution higher than international ambient air quality standards allow for, exposing refugees to a major public health hazard in form of respiratory infections. According to the Global Alliance for Clean Cookstoves, exposure to cookstove smoke contributes to 13,000 premature deaths every year in Uganda and affects 35 million people within the country (GACC, 2014) with women and children being most affected because they spend more time in kitchens preparing food).

In addition to the act of cooking itself, the task of gathering fuelwood also falls mainly on refugee women and children who commonly have to walk by foot alone or in small groups for long distances – 4-8km – in search for firewood. This predisposes them to SGBV in the form of to rape, attempted rape, defilement, assault, snake bites, attack by wild animals, and an increased danger of refoulement and arrest for illegal fuelwood collection (UNHCR Uganda Energy and Environment Community Assessments, 2015). While contributing to deforestation, burning biomass also contributes to emission of greenhouse gases in the form of black carbon and carbon dioxide that cause climate change (NEMA, 2013).

Against this backdrop, Uganda SAFE Strategy is formulated on the premise that access to energy and energy efficiency is inextricably linked to improved welfare and human development as enshrined in UNHCR's Global SAFE Strategy (2014-2018), whose main purpose is: "to enable refugees and other persons of concern to meet their energy needs (cooking, lighting, and powering) in a safe and sustainable way." In line with the Global SAFE Strategy, Uganda's SAFE Strategy has four strategic objectives: (i) improved household access to fuel-efficient technologies and renewable energy; (ii) improved access to fuel-efficient technologies and renewable energy at institutions within and around settlements; (iii) Energy considerations integrated into UNHCR emergency preparedness and response plans; and (iv) Community-based management of woodlots and multi-purpose plantations enabled and managed, in and around settlements, for income generation, fuel supplies, food security and environmental rehabilitation.

These strategic objectives seek to promote clean and sustainable energy efficiency for cooking and lighting through a complementary two-pronged approach targeting both energy demand and supply: (a) improving biomass fuel efficiency because although use of biomass is expected to decline, it is unlikely that absolute consumption of biomass will decrease over the coming decades due to population growth and urbanisation ; and (b) fuel substitution from biomass to renewable energy such as biogas, solar and hydropower.

Whereas the supply side is intended to address energy issues before the fuel reaches the final users, and includes the production, marketing and distribution/sales of fuels and of appliances such as improved cook stoves, the demand side will address the final use of energy, consisting of cooking in

households, institutions and commercial enterprises, as well as agro-processing, other productive activities such as fish smoking and other competing (non-energy) uses of biomass (e.g. construction, furniture production) in order to assess whether these directly compete with energy use.

These four strategic objectives of Uganda's SAFE Strategy will contribute to and are in line with:

- Uganda's Vision 2040 (which seeks to improve household access to clean energy to 80 percent of the population);
- Uganda's renewable energy policy, 2007whose goal is: "to increase the use of modern renewable energy, from the current 4% to 61% of the total energy consumption by the year 2017";
- Uganda's National Forest Plan 2011/2012-2021/2022 whose goal is " an integrated forest sector that achieves sustainable increases in economic, social and environmental benefits from forests and trees by all the people of Uganda, especially the poor and vulnerable.";
- Uganda's NDP II (2015/2016-2020/2021) under the Settlement Transformative Agenda (STA) that seeks to manage settlement land in an efficient and sustainable manner, foster sustainable livelihoods for refugees and host communities, and protect and conserve the natural environment in and around the refugee settlements;
- UNDAF under the ReHoPE strategy that seeks to promote peaceful co-existence, service delivery and resilience of both the refugees and host community; and
- Sustainable Development Goals: 7 (ensure access to affordable, reliable sustainable and modern energy), 8 (promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all), 13 (take urgent action to combat climate change and its impacts) and 15 (sustainably manage forests).

1.1 COUNTRY OVERVIEW

Though rich in energy resources, Uganda's energy consumption matrix stands at about 93 percent biomass, 6 percent petroleum products and one percent electricity (MEMD, 2014). Firewood comprises the bulk of biomass used (79 percent), supplemented to smaller extents by charcoal (6 percent) and crop residues.

An estimated 10 percent of all households in Uganda use efficient stoves and only 18 percent have access to electricity (World Bank, 2012). In rural areas, 97 percent of households have no access to electricity and therefore rely on kerosene and other inferior fuels for lighting. This is more or else the same situation in refugee settlements.

1.2 REFUGEE SITUATION

Uganda is currently host to almost half a million refugees, primarily from Burundi, the Democratic Republic of the Congo, Rwanda, Somalia and South Sudan (Table 1). UNHCR Uganda works with the Department of Refugees in the Office of the Prime Minister (OPM) that plays the following roles in providing protection and assistance to refugees:

- formulating and implementing the refugee policy;
- receiving asylum seekers and determining their status;
- observance of international laws;
- ensuring order in refugee settlements;
- ensuring physical security to refugees;
- settling refugees through the provision of land;
- provision of integrated services to refugees and host communities; and
- monitoring and co-ordination of refugee programmes and issues.

Table 1. Refugee and asylum seekers, August 2015

Country of origin	Adjumani	Kampala	Kiryandongo	Arua	Kyaka II	Kyangwali	Nakivale	Oruchinga	Rwamanja	Total
DRC	07	32,541	210	5,610	22,178	37,653	42,118	2,244	61,480	204,041
South Sudan	113,765	7,778	41,507	21,717	4	3,278	46	0	0	188,095
Somalia	0	16,102	1	0	6	7	16,331	0	0	32,447
Rwanda	0	2,477	26	24	1,675	314	10,676	1,654	115	16,961
Burundi	0	3,667	18	16	748	19	19,633	1,611	0	25,712
Others	126	12,595	471	522	37	31	1,530	0	0	15,313
Total	113,898	75,160	42,233	27,889	24,648	41,302	90,334	5,510	61,595	482,569

Source: Government of Uganda, Office of the Prime Minister, 2015

Current refugee numbers are expected to increase, due to the instability in Burundi and South Sudan.The Government of Uganda has long supported a favourable refugee policy that operates a settlement approach as opposed to camps. Refugees are also allowed freedom of movement and employment/work just as its citizens, all of which are important elements in shaping the current SAFE Strategy. Refugee issues, for example, are included in the government's NDP II (2015/2016-2020/2021) under the STA and the ReHoPE strategy, both of which recognise that refugees and host community needs should be planned and provided for in a holistic manner based on the following six pillars:

(i) efficient and sustainable land management;

(ii) foster sustainable livelihoods and socio-economic growth;

(iii) governance and the rule of law;

(iv) peaceful co-existence and social cohesion between refugees and host communities;

(v) environmental protection and conservation in and around the refugee settlements; and

(vi) community infrastructure provision in refugee hosting areas in accordance with local government plans and systems.

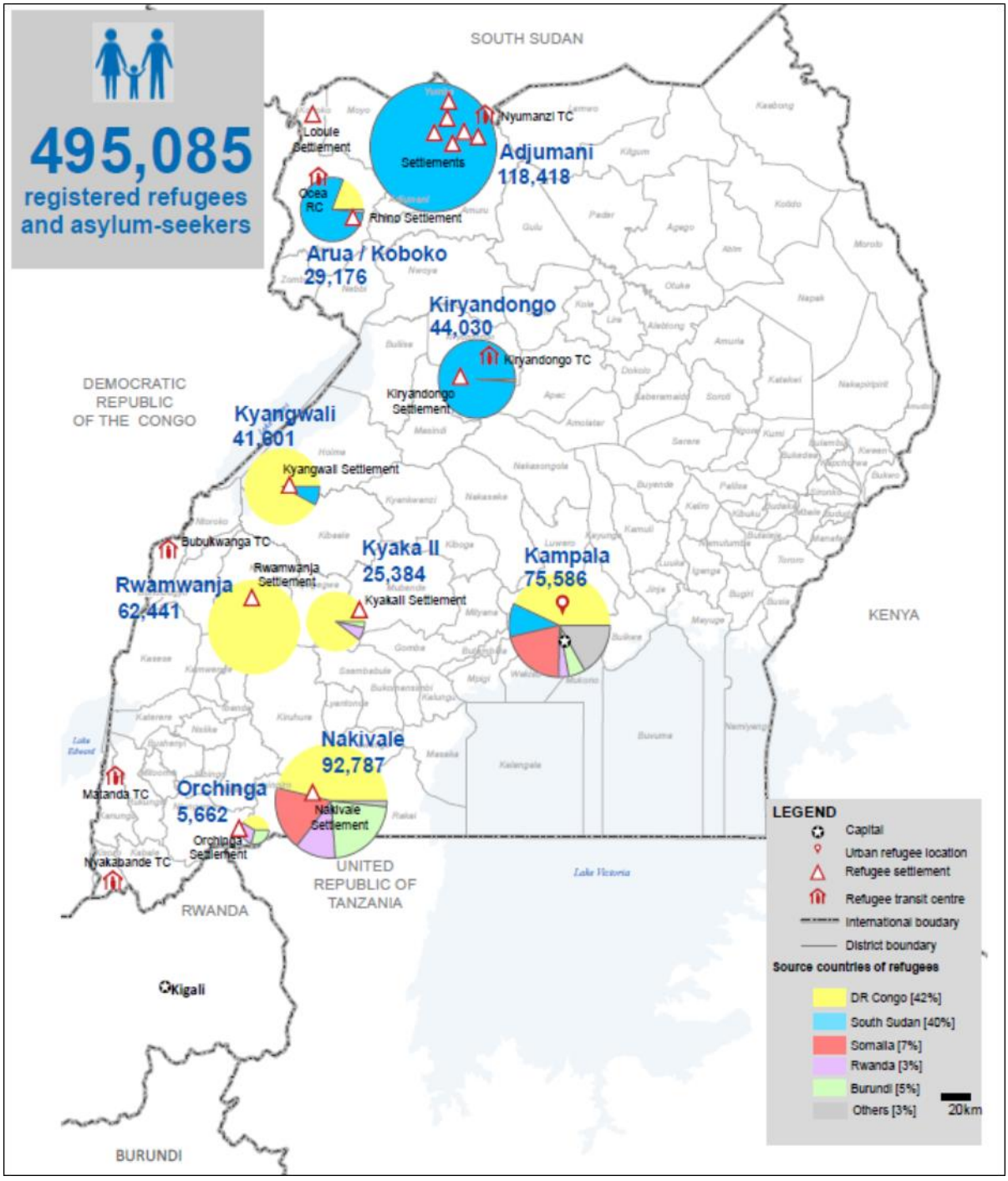
The ReHoPE strategy – as a durable solutions approach focuses on local integration by fostering joint programming in refugee-impacted districts. This SAFE strategy is therefore integral in the realisation of ReHoPE as it aims at improving access to safe and clean fuels and energy for both refugees and host communities in order to improve the protection of refugees and general well-being of both refugees and the host community.

Table 2. Refugee Households per Settlement

Settlement	Households	Asylum Seekers	Total
Adjumani	20,681	57	20,738
Kiryandongo	9,609	103	9,712
Koboko	1,131	0	1,131
Kyaka II	6,915	171	7,086
Kyangwali	10,848	385	11,233
Nakivale	19,779	2,789	22,568
Oruchinga	1,456	55	1,511
Rhino Camp	4,271	20	4,291
Rwamwanja	19,786	282	20,068
Total	**94,476**	**3,862**	**98,338**

Source: UNHCR Uganda Energy and Environment community assessments, 2015

Figure 1. Location of Refugee Settlements (30th September 2015)



Source: UNCHR Info-graphic and statistics, http://data.unhcr.org/

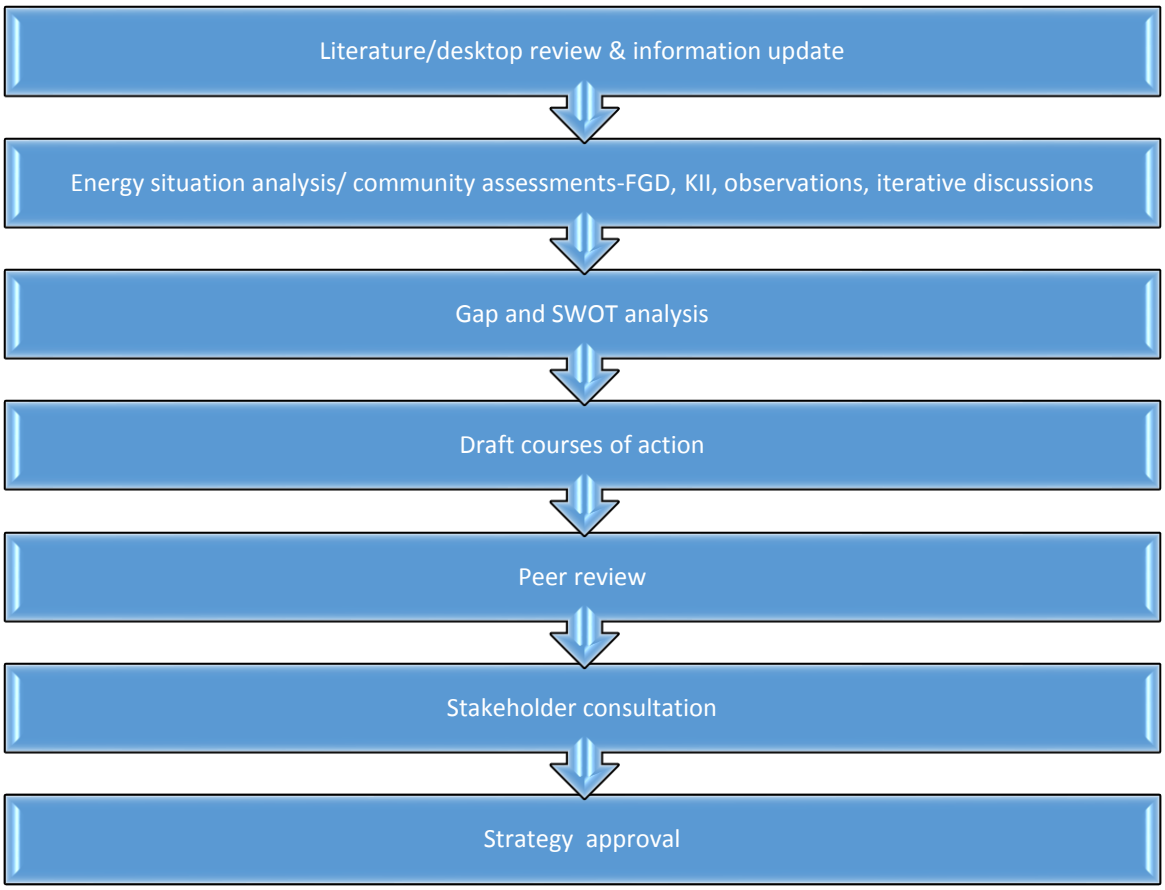
1.3 Methodology

To understand the current energy and environmental situation in and around settlements, literature and desktop reviews were undertaken and first hand data collected from different sources. These included community assessments conducted in all eight settlements as well as the corresponding host

community, including stakeholder/key informant interviews, direct observations and interactive discussions at field sites.

A Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis was conducted and recommendations made to ensure successful implementation of the SAFE strategy. Four regional stakeholder consultative workshops (one each in the south-west and mid-west and two in West Nile) were held to discuss the draft strategy, including analysis of community assessments and proposed actions (recommendations). UNHCR sectoral focal points, implementing partners (Danish Refugee Council, Lutheran World Federation, Nsamizi, Inter-Aid Uganda), operating partners (OPM, Adventist Development and Relief Agency, CEFORD, the Agency for Co-operation and Research in Development, Save the children, World Vision, Oxfam GB, GIZ, the Finnish Refugee Council and American Refugee Council, Welthungerhilfe and Action Africa Help), the private sector (GVEP, Carbon impact, Green fire, Adapt plus, Uganda Carbon Bureau) and District Local Governments hosting refugees were consulted.

Figure 1: Methodological sequence



1.4 ENVIRONMENTAL OVERVIEW

The main environmental challenges faced in the settlements are a result of small plots of land (e.g. 30m² and 50m²) allocated to refugees which inhibits sound natural resource management. The continuous use of these plots for competing land use activities such as shelter and agriculture has led to local deforestation, household pollution, soil exhaustion, flooding, siltation and eutrophication of surrounding water bodies. The main environmental problems are summarised in the Table 3.

Table 3. Main environmental issues in settlements

Region	Settlement	Main environmental issues
West Nile	Adjumani, Rhino camp	Soil exhaustion/infertility, siltation, flooding due to poor drainage, local deforestation/vegetation cover loss, poor solid waste management, poor disposal of lead batteries, soil erosion, wild fires and bush burning, indoor air pollution, poor land use planning, no management plans for established woodlots
Mid-west	Kiryandongo, Kyangwali	Water turbidity due to iron core contamination of water sources, poor solid waste management, bush burning, deforestation, no management plans for established woodlots, indoor air pollution, poor land use planning
South-west	Nakivale, Oruchinga, Kyaka II, Rwamanja	Soil erosion, wetland degradation, deforestation, flooding, sand mining, indoor air pollution, no management plans for established woodlots, poor solid waste management, water turbidity, siltation, poor land use planning

Source: UNHCR Uganda energy and environment community assessments, 2015

To tackle the aforementioned issues, a series of environmental management activities have been undertaken over the years including: construction and use of energy saving stoves such as portable and fixed rocket *lorena* stoves, the Uga stove and the Save 80 stove at both household and institutional levels; individual and community tree planting; community environmental awareness campaigns; tree marking; conservation agriculture; use of solar energy; use of briquettes; formulation of community environment action plans for some settlements; capacity building; and establishment of environmental structures such as local environmental committees and environmental clubs. However,

most such interventions have been conducted on *ad hoc* basis and, therefore, there is need for scaling up in both size and scope.

This current strategy addresses these issues and incorporates lessons learned from desktop research and community assessments such as: the need for environmental mainstreaming in all of UNHCR's Uganda operations; building the capacity of staff, community and partners on environmental management for sustainability; continuous environmental education; the need to establish management plans to resolve ownership issues; establish and implement a meticulous monitoring and evaluation system for evidence-based programming and measurement of results.

1.5 ENERGY SITUATION IN REFUGEE SETTLEMENTS

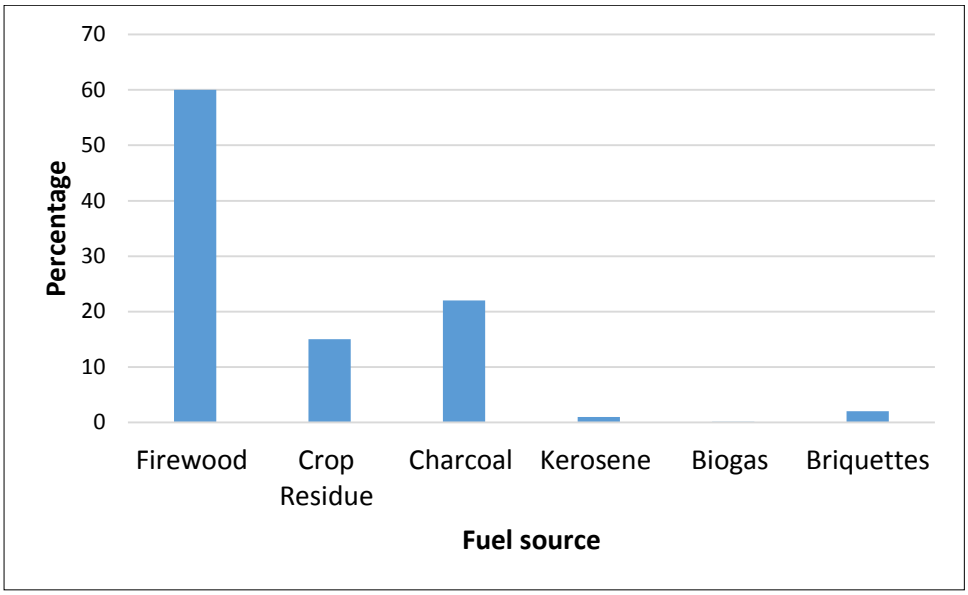
In Uganda, 97 percent of refugees and 95 percent of the host community depend on biomass especially firewood, charcoal, small sticks, and crop residues such as maize cobs and stalks. However, because firewood is becoming scarcer in and around settlements, refugees – especially women and children – walk on average of 4-8km and spend about 6-10 hours searching for firewood (UNHCR Uganda energy and environment assessments, 2015). Some have even have resorted to using plastic materials such as bottles for cooking which poses a serious health concern.

This situation is now becoming more serious as refugees now illegally collect firewood in some neighbouring forest reserves (Zoka FR in Adjumani, Katonga FR in Rwamanja, Bugoma FR in Kyangwali; refugees in Oruchinga even cross over to Tanzania). Wood consumption in and around the settlements surpasses natural replenishment and has consequently led to deforestation and forest degradation as well as contributing to conflict over firewood between refugees and the host community. Incidents of refugees being chased and assaulted during firewood collection have been reported (UNHCR Uganda Energy and Environment Community Assessments, 2015).

1.5.1 COOKING FUELS

The main biomass fuel used for cooking is firewood, which accounts for 60 percent of household needs (Figure 2), followed by charcoal and crop residues (22 percent and 15 percent, respectively). An average refugee household has five members and consumes an average of 8.5kg of firewood per day, or 1.7kg/per person/per day. Briquettes account for around 2 percent of energy needs and kerosene a further one percent. Fuelwood uses are similar between refugees and the host communities.

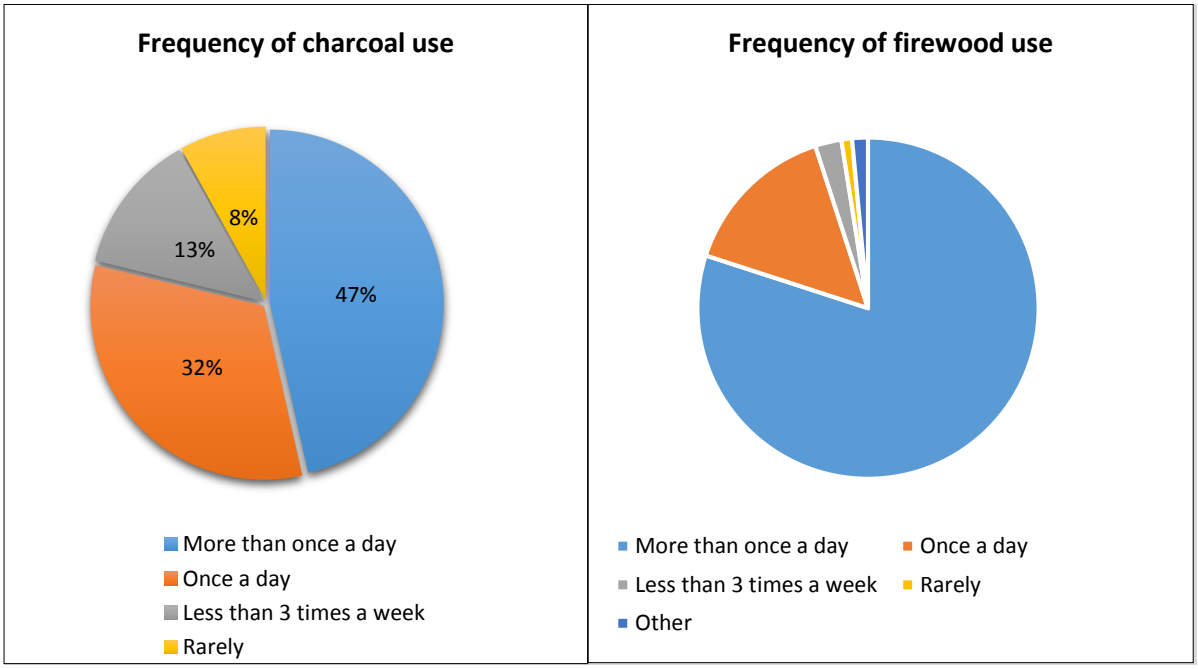
Figure 2. Main Fuels used in Refugee Settlements



Source: Community assessments, 2015

Firewood is used more than once a day by 80 percent of the refugees and host population, whereas 15 percent use it only once a day (Figure 3). Only two Percent of the population surveyed use firewood rarely and less than three times a day. At the same time, 47 percent of the refugee community use charcoal more than once a day, 32 percent once daily, 13 percent use charcoal less than three times a week and eight percent use it rarely.

Figure 3. Frequency of Use of Common Biomass Sources



Source: UNHCR Uganda Energy and Environment Community Assessments, 2015

As a result of Uganda's settlement policy, firewood is not distributed to refugee households and institutions. The only exception is at reception centres where firewood is purchased from suppliers by UNHCR through Implementing Partners who manage the reception centres**.**

Table 4. Monthly Quantity of Firewood Consumed at Reception Centres

Region	**Settlement**	**Reception centre**	**Quantity used per week (kg)**	**Cost per month[1]**		**Stove used**
				UGX	**US$**	
West Nile	Adjumani	Nyumanzi	8,400	1,050,000	390	Three-stone and mud stoves
	Rhino Camp	Ocea	3,000	300,000	112	Three stone
	Koboko	Kuluba	2,000	140,000	52	Three-stone and mud stoves
Mid-West	Kiryandongo	Kiryandongo	2,400	360,000	134	Three-stone mud stoves and LPG
South- West	Nakivale	Nakivale	3,600	450,000	167	Three-stone and mud stoves
	Rwamanja	Mahani	3,600	375,000	139	
Total			**23,000**	**2,675,000**	**994**	

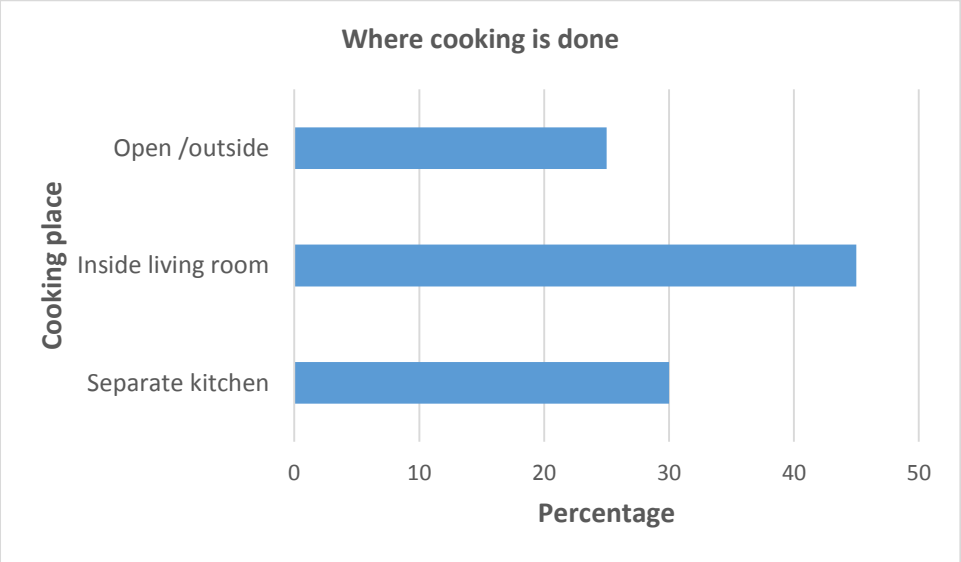
Source: UNHCR Uganda Energy and Environment Community Assessments, 2015

Table 4 above shows that 23,000kg of firewood is currently used each month at reception centres, at a cost of some US$1,000, though the consumption figures vary according to the number of people at the centres. In late 2015, Nyumanzi Reception Centre for example was experiencing an influx of South Sudanese refugees which explains the high consumption rate of firewood.

At the household level, only 30 percent of refugee households have a separate kitchen (Figure 4), with most (45 percent) cooking inside the living room and a further 25 percent cooking in the open. Of the families which possess a separate kitchen area for cooking, only 23 percent of these facilities also had a chimney.

[1] Exchange rate used is: 1US$=2,692UGX

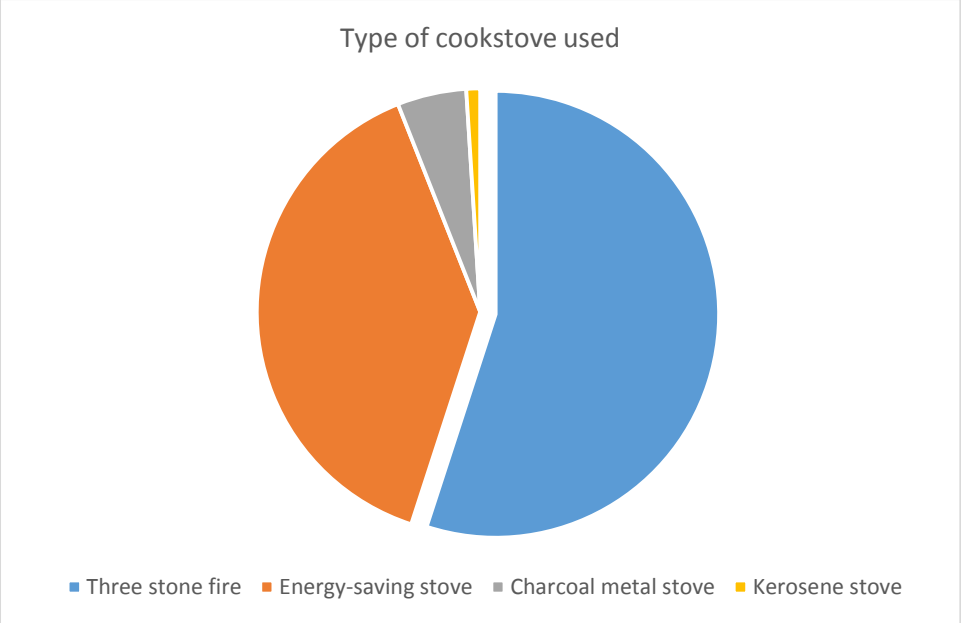
Figure 4. Cooking Areas



Source: UNHCR Uganda Energy and environment Community Assessments, 2015

The traditional three-stone fire is used by 55 percent of refugee households for cooking, followed by energy saving stoves (i.e. mud stoves, Uga stove and save 80) at 39 percent. (Figure 5).

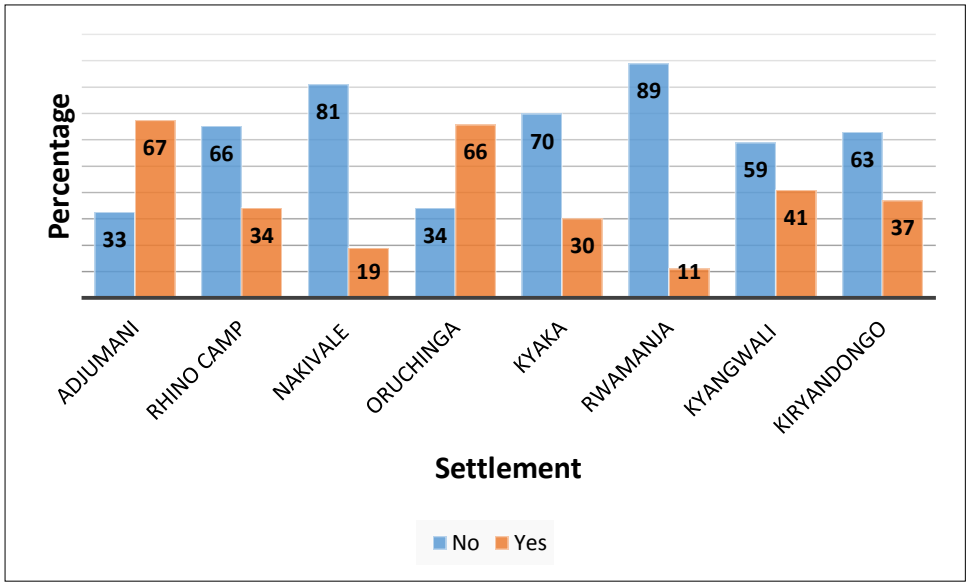
Figure 5. Type of Cooking Stoves Used



Source: UNHCR Uganda Energy and Environment Community Assessments, 2015

With the exception of Adjumani and Oruchinga settlements, energy-saving stoves are used by less than half of the community and, in cases such as Rwamanja Settlement, by only 11 percent of households (Figure 6).

Figure 6. Use of Energy-saving Stoves in Settlements



Source: UNHCR Uganda Energy and Environment Community Assessments, 2015

Table 5. Cooking Energy Options

Energy saving stoves options	Description	Advantages (Production and End-user)	Limitations (Production and End-user)
Panel-type Solar cookers	This is a hybrid that combines the reflective properties of a curved surface with the heat retaining properties of a container.	• Solar cooking requires little attention • Eco-friendly • Is cheaper in the long-run as compared to the traditional systems	• Cooking is slower than traditional systems • Cannot cook foods that require grilling, deep frying or regular turning • cooking must take place when the sun is shining • checking the food during cooking results in considerable heat loss • all cooking must be done outside, against tradition dictates that cooking is done in a kitchen shelter • It is severely impaired when conditions are windy, hazy, dusty or cloudy, meaning that cooking may need to be finished over a fire • Not efficient at retaining heat as conventional cooking devices • Eyesight damaged if the concentrated sunlight beams are reflected back into someone's eyes
Rocket Lorenas/ mud/clay stoves (unfired mud stoves) locally known as "Londerezas"	These are the most commonly promoted stoves by implementing partners because they are made using locally available materials such as clay, straw, grass and saw dust. Cow dung is sometimes added for improved adhesion of materials. They are not fired in a kiln.	• Can use both firewood and charcoal • Consumes less firewood compared with a three-stone fire • Less smoke/indoor pollution • Less risk of fires and burns • Construction materials are locally available • Can be designed and fabricated to	• Requires regular maintenance to ensure efficiency as cracks develop. • Susceptible to damage from weather if used in the open • Stove designs in which pots rest within the stove hole limit the circumference of the pots that can be used with that stove. • Reduced performance and damage of the stove due to excess wood being placed in the fire compartment

		accommodate multiple pots	• Tedious to construct • Lifespan of two years, maximum
Ceramic Stove (kiln-fired mud stove)	Constructed with clay/soil combined with organic materials that are fired at high temperatures in a kiln for added durability	• Can use wood or charcoal (with addition of a metal or ceramic grate) • Stoves can be portable or fixed • More durable than mud stove if fired or dried correctly	• Requires regular maintenance • Firing the kiln requires fuel • Skilled personnel are needed for kiln firing and drying • Quality control of the kiln/firing process and the clay mixture must be stringent in order to minimise breakage and maximise efficiency
Combined metallic and clay stoves, e.g. Save 80	Assembled or manufactured metallic stoves, sometimes ceramic liners or grater. Quality control and pre-test are conducted in factories before shipping.	• Lightweight • Portable • Heat up quickly • Durable • Less maintenance required compared with other categories • May be able to burn multiple types of fuel (depending upon the specific model)	• Stoves cannot be produced locally • High marketability i.e. can be sold easily • Pot size is convenient only for small families of less than six people • More expensive than mud or ceramic stoves that use local materials and labour
Energy options	**Description**	• **Advantages (Production and End-user)**	• **Limitations (Production and End-user**
Biomass briquettes	Made from compressed biodegradable materials such as maize cobs, charcoal dust, groundnut shells, animal dung and sawdust.	• Biodegradable materials are readily available • High thermal intensity and non-volatile fuel, hence easy and safe to store • Can be made in various shapes and sizes • Cheaper as compared with other forms of biomass • Don't emit smoke	Currently, there are two plants producing briquettes in the south-west.

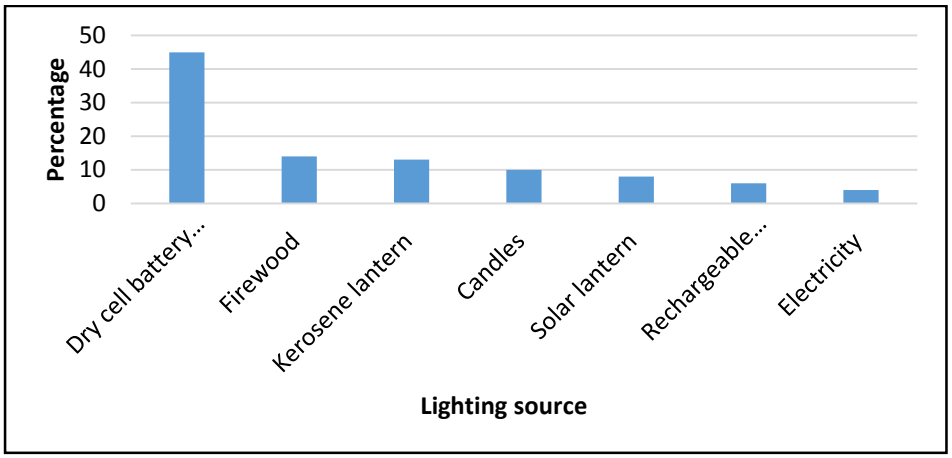
Biogas	Produced when microbial organic matter decomposes under anaerobic conditions. It is generally made using sludge or animal manures rich in carbohydrates, proteins and lipids Biogas contains a mixture of methane and carbon monoxide as well as some trace gases such as nitrous oxide	• Is a cheaper technology in the long run and much simpler than those for other bio-fuels, • It is ideal for small scale application • Non-polluting and renewable source of energy • Produces enriched organic manure, which can supplement or even replace chemical fertilizers • Leads to improvements in the environment, sanitation and hygiene • Uses any biodegradable matter as substrate • Mitigates climate change	• High initial costs • May be unacceptable to certain cultures • Prone to explosion if the methane comes in contact with oxygen so requires technical skills to use and maintain • Biogas contains a number of impurities that corrode metallic parts of the combustion engines • Settlement layout may not be conducive to biogas production as consistent and significant inputs of sludge and water are required
Hydro-power	This is power derived from the force of moving water and generated by turbines	• climate friendly and clean renewable energy source • suitable for both low and high loads i.e. can be used for cooking, lighting and other productive uses	• Hydropower plants can be impact ed by drought • High cost of connections • Bureaucracy

1.5.2 LIGHTING

For lighting, 45 percent of refugees use dry cells, followed by firewood and kerosene lanterns at 14 percent and 13 percent respectively. Less than 10 percent of household use renewable energy sources such as solar and electricity as shown in table 7. The strategy aims at improving household access to renewable energy sources for health and environmental benefits. Environmentally replacing kerosene lights with solar lighting will result in clear reduction in emissions as evidenced by the Clean Development Mechanism (CDM) which uses a default value of $0.092tCO_2e$/year for a solar light replacing a kerosene lantern, which is equivalent to 36 litres of kerosene a year. To put that in context, a refugee population of 500,000 people, with an average of four people and one lantern per

household, could reduce their emissions by 11,500tCO_2e/year. Furthermore, solar lighting will also reduce fuelwood use where the three-stone fire is the only source of light.

Figure 7. Lighting sources used by refugees



Source: UNHCR Uganda Energy and Environment Community Assessments, 2015

Table 6: Lighting Energy Options

Energy Options	Description	Advantages	Limitations
Domestic			
Solar lanterns	Portable and rechargeable lights, using a small photovoltaic (PV) panel.	• Can be used for indoor and outdoor use • No indoor air pollution • Easy to operate • Higher quality of light as compared with other alternatives • Convenient as it requires no maintenance • Safe	• Expensive • Some models light for limited lighting hours-three hours depending on the level of lighting used • Easily get damaged/broken

Energy Options	Description	Advantages	Limitations
Fixed solar panels	Stand-alone photovoltaic systems for individual households. This is an appropriate technology to meet the energy demands of off-grid communities	• Appropriate for low-wattage direct current appliances e.g. lights, TVs, radios etc. • Many outlets can be installed • The life cycle cost of PV is often less when compared to diesel generators	• Initial cost is high • Requires replacing batteries • The number and type of appliances that can be used is limited due to low wattage • Sales, installation and support infrastructure for is largely underdeveloped leading to higher delivery and maintenance cost. • In remote unguarded locations, there is risk of components being stolen or vandalized
Hydro-power	This is suitable for settlements near the national grid	• climate friendly and clean renewable energy source • suitable for both low and high loads i.e. can be used for cooking, lighting and other productive uses	• Hydropower plants can be impacted by drought • High cost of connections • Bureaucracy •
Institutions			
Biogas light	Potentially useful for institutions e.g. in classrooms and dormitories, teachers' houses	• Once a biogas plant is installed, there is no additional cost • No indoor pollution	• Less lighting hours due to competition from other uses such as cooking • Limited to areas where digesters are located

Energy Options	Description	Advantages	Limitations
Institutional photovoltaic system	Stand-alone PV system installed to power equipment, centres or for pumping water	• Cheaper in the long-term as compared with diesel generators • No pollution • Safe to use	• High start-up cost • Requires skilled and personnel to operate and maintain
Hydro-power	This is suitable for institutions near the national grid that can pay	• climate friendly and clean renewable energy source • suitable for both low and high loads i.e. can be used for cooking, lighting and other productive uses	• Hydropower plants can be impacted by drought • High cost of connections • Bureaucracy •
Public/street light			
Solar street lighting	Elevated outdoor light sources, powered by PV panels which are either mounted on the lighting structure or connected within the pole PV panels have a rechargeable battery, providing power during the night.	• Modern solar panels require less maintenance as they don't involve any moving parts and last for about 20-25 years • Lower accident risk given the lack of wiring • Environment-friendly as PV panels are powered only by sunlight	• High initial investment • Vandalism and risk of theft due to the monetary value • Dust and moisture can accumulate on horizontal panels leading to reduced or zero energy production • Rechargeable batteries will need to be replaced a few times within the lifetime of the fixtures
Hydro-power	This is suitable for public	• climate friendly and clean renewable energy source	• Hydropower plants can be impacted by drought • High cost of connections

Energy Options	Description	Advantages	Limitations
	places near the national grid	• suitable for both low and high loads i.e. can be used for cooking, lighting and other productive uses	• Bureaucracy •

1.6 DOMESTIC DEMANDS IN UGANDA

The current situation is that biomass energy demand outstrips supply. Because of this high dependence on biomass energy, this Strategy envisages that biomass will continue to play a major role in Ugandan settlements for several decades hence the need to put in place measures for sustainable biomass production and management. This is due to the fact that Uganda's soils and climate supports relatively fast growth rates of biomass in addition to the high potential to diversify to other forms of biomass rather than only focusing on tree biomass.

The Uganda SAFE strategy addresses issues of management of the biomass sector, efficiency and technology transfer through fuel substitution and the introduction of efficient technologies, together with a shift from traditional energy technologies to more advanced and cleaner alternatives (solar and biogas).

Biomass briquettes, biogas, solar and hydropower are renewable energy options that have been proposed because of the following reasons.

a. **Biomass briquettes:** Following the success of a charcoal briquette pilot project in Oruchinga settlement, and ad hoc briquette use in other settlements, there is a need to scale-up this intervention in all the other settlements starting mid-2016. Briquettes have demonstrated a significant potential for energy efficiency, reduced refugee's household energy expenditure, reduced indoor air pollution thus improving refugee health, reduced women drudgery, created employment for both refugees and nationals, and reduced the incidence of exposure of girls and women to SGBV.

Based on the above, the use of briquettes needs to be increased in all settlements because of the ready availability of various biomass sources used for making briquettes such as charcoal dust, banana

peelings, husks and binder/starch. Community sensitisation and awareness creation campaigns have been conducted and, consequently, refugees appreciate the use of briquettes. In light of this, there is need to ensure adequate production of briquettes to meet the fuel demands of refugees which requires a shift from using the hand pressing machines to motorised machines.

The use of briquettes is also expected to generate carbon credits (CERs), which will become a source of income that will help foster the sustainability of these interventions.

b. **Biogas:** Biogas will be promoted at the institutional level in all settlements because of the ready availability of waste materials. This activity will be undertaken on an operational research basis. Households with cattle will also be supported based on the success of the pilot that was carried out in Adjumani District as shown in Box 2.

Ms Queen, a South Sudanese refugee resident in Oliji Refugee Settlement, Adjumani District, and head of a family of ten (three children of her own and a foster mother to seven others), is one the beneficiaries of a biogas pilot project initiated by UNHCR through its implementing partner the Danish Refugee Council. She owns five cows from which she collects manure that is used as a raw material for biogas generation. "Cow dung was of no value to me before this pilot project. But it has become an important resource for my family." She also asserted that "This biogas plant is one the most important household assets I have ever owned. It has become my main source of energy for cooking, replacing wood fuel that I collected from a distance of about 4km. Biogas use has enabled me to save about US$100 a year that I used spend on woodfuel."

Further, M. Queen remarked that, "the biogas stove takes shorter time than the improved mud stove, which has allowed me to use the time for other productive household activities. Besides, the stove does not produce smoke that usually itches my eyes and cause respiratory infections."

Finally, Ms Queen uses the by-product of bio slurry as an organic fertilizer for vegetable production. "I prefer producing onions from which I earn US$150-180 per annum which I use to pay for my children's school fees", she reported.

c. **Solar**: With the exception of Nakivale and Kyaka II settlements, other settlements are not served by the national grid. This situation is not expected to change for some time. As such, solar energy technology which has been proven to be very successful in providing energy services to very inaccessible areas will be promoted. According to Uganda's 2002 Energy Policy, Uganda's solar radiation is about 45kWh/m^2/day, which is favourable for all solar technology applications especially solar photovoltaic (PV), water heating, cooling and crop drying. PV systems are proposed because refugee power needs are modest. The main envisaged uses of the PV systems

are for domestic, public and institutional lighting, telecommunications, vaccine and blood refrigeration, and for operating radios and televisions.

Synergies with government programmes are foreseen because solar PV technology is currently being promoted by the government and donors through a financing mechanism that makes it possible for both PV consumers and vendors to obtain credit from banks for solar rural electrification. Opportunities within the PV sector are underlined by an ambitious target by government to supply 61 percent of total consumed energy from renewable sources by 2017 (currently 4 percent). The Rural Electrification Agency provides subsidies and targeted approaches to encourage PV implementation, and has worked with the private sector, in co-operation with the World Bank, through the Energy for Rural Transformation initiative for cost-sharing and market development. As a result, the Government of Uganda has exempted solar PV products from taxes import licences (GTZ, 2009)[2] and this is still the case to date.

d. **Hydropower**: Connection to the national grid for South-West and Mid-West refugee settlements is possible due to their proximity to the national grid. The Government through its STA strategy proposes to provide access to electricity to the settlements by 2020. This SAFE strategy also taps in to this and will enhance productive use of electricity especially for micro, small and medium entrepreneurs in the agricultural, artisan and commercial sectors through; improving agricultural production, value addition and diversification hence, improving livelihoods. Some of the productive uses envisaged include: cooking, drying, heating, smoking, baking, refrigeration and manufacturing.

To achieve 100 percent coverage of clean and efficient energy and to harness the benefits of climate/carbon financing in all eight settlements, some 98,000 efficient cook stoves; 98,000 solar lanterns and 5,000 street lights are needed as indicated in Table 7.

Table 7: Domestic energy needs per settlement

Region	Settlement	Current population	# of HHs	# of stoves in place	# Stoves needed	# of domestic lights in Place	# of domestic lights needed	# of street lights in place	# of street lights needed
West Nile	Adjumani	113,898	20,738		20,738		20,738		200
	Rhino Camp	22,279	4,291		4,291		4,291		40
	Koboko	5,610	1,131		1,131		1,131		10

[2] Target market analysis of Uganda's solar energy sector. See https://www.giz.de/fachexpertise/downloads/gtz2009-en-targetmarketanalysis-solar-uganda.pdf

Region	Settlement	Current population	# of HHs	# of stoves in place	# Stoves needed	# of domestic lights in Place	# of domestic lights needed	# of street lights in place	# of street lights needed
	Sub-total	141,787	26,160		26,160		26,160		250
Mid-West	Kiryandongo	42,233	9,712		9,712		9,712		92
	Kyangwali	41,302	11,233		11,233		11,233		110
	Sub-total	83,535	20,945		20,945		20,945		202
South-West	Nakivale	90,334	22,568	1200	22,568	2550	22,568	437	210
	Oruchinga	5,510	1,511		1,511		1,511		10
	Kyaka II	24,648	7,086	850	7,086		7,086		75
	Rwamanja	61,595	20,068		20,068		20,068		205
	Sub-total	182,087	51,233		51,233		51,233		500
Grand total		**407,409**	**98,338**	**32,200**	**98,338**	**2,550**	**98,338**	**3,378**	**5,000**

Source: UNHCR end of year energy and environment report, 2015

The aforementioned interventions and technologies for cooking and lighting are appropriate for all the phases of refugee operations in Uganda i.e. from emergency, care and maintenance to durable solutions. The only difference will be the method of delivery which may change with the phase of the emergency but the technologies can remain the same. The key challenges and barriers to widespread adoption of these energy options in refugee settlements and the host community include financial, regulatory, practical, cultural and social issues.

1.7 NATURAL RESOURCES MANAGEMENT

Firewood is the main resource harvested around settlements, mainly for cooking needs. In many cases, this has led to environmental degradation and localised deforestation which, itself, has become a cause of concern and tension with host communities.

UNHCR has long invested in environmental rehabilitation activities in Uganda, both as a means of remediation of damage done, but also with a view to providing the basics for sustainable harvesting of firewood and shelter materials. To date, some 1,100ha of woodlots have been established in refugee-hosting areas as shown in Table 8.

Table 8. Established woodlots in settlements

Settlement	Area (ha)	Main species
Kyangwali	204	*Eucalyptus*, Indian teak (*Tectona grandis*), *Markhamia lutea*
Kiryandongo	11	*Eucalyptus*, *Markhamia lutea*
Nakivale	120	*Grevillea robusta*, *Eucalyptus*
Oruchinga	48	*Grevillea robusta*, *Eucalyptus*, *Azadirachta indica*, pine
Rwamanja	42	*Eucalyptus*, *Grevillea robusta*, pine
Kyaka II	12	*Grevillea robusta*, *Eucalyptus*
Adjumani	608	*Eucalyptus*, *Markhamia lutea*, Indian teak, *Gmelina arborea*, *Leuceana*, Neem, melia, Khaya, *Grandifoliolia* spp, *Thevetia* spp and *Acacia macrothyrsus*
Rhino camp	84	Indian teak
Total	**1,129**	

Source: UNHCR Uganda country reports and community assessments, 2015.

To improve ownership of woodlots and promote tree planting further, management plans for existing and future woodlots will be undertaken by District Local Governments, UNHCR, and OPM in collaboration with National Forestry Authority. In conjunction with foreseen Community Environmental Action Plans (CEAPs), biomass will be grown and harvested as a partial solution to meeting some of peoples' energy needs, with the many other environmental and livelihood benefits which emanate from CEAPs through integrated agricultural and forestry systems and livelihood generation and diversification. Future activities will also take into account the need to prepare for potential disasters and vulnerability to climate change. In this regard, this Strategy also contributes to the Uganda's Nationally Appropriate Mitigation Actions.

2.0 COUNTRY PROGRAMME STRATEGY

This Strategy addresses energy interventions in all eight refugee settlements, together with those of the host community, building upon lessons learned from past interventions. In designing this Strategy, particular attention was given to ensuring that its principles and actions were fully supportive to the national STA, the NDP II, the National Forest Plan, Vision 2040 and the ReHoPE Strategy.

2.1 GUIDING PRINCIPLES

The Guiding Principles for this Strategy are aligned with those described in the UNHCR Global SAFE Strategy (2014-2018), namely, Protection, Access, Equity, Access, Sustainability, Community Empowerment, and Appropriateness and Reliability:

Protection

Gathering fuelwood is a laborious and often dangerous task that is undertaken mostly by women and children, commonly in isolated areas at the outskirts of a settlement or even well beyond its boundary. Refugees walk 4-8 hours, covering distances of 4-10km to gather firewood. This, therefore, predisposes people to acts of SGBV in the form of physical assault or attempted rape, an increased danger of arrest for illegal fuelwood collection and possible refoulement. Firewood collection has also in some instances given rise to tension and conflict between refugees and the host community over the use of natural resources.

Lack of lighting around settlements is another potential opportunity for SGBV, since refugee women and other vulnerable groups feel unsafe at night, in particular when going to latrines, collecting water or using bathing areas. Incidents of women and adolescent girls being attacked when walking to and using dark toilets have been reported. Furthermore, the lack of lighting in or around settlements restricts movements in the night, depriving people of valuable time and activities such as recreational activities or social gatherings.

Equity

Implementation of this Strategy will be based on the Age, Gender and Diversity (AGD) approach to ensure equality and enjoyment of rights by all persons of concern, while benefitting from peoples' own rich capacities to help achieve energy efficiency. This Principle reinforces a participatory, rights- and community-based approach, all of which are aimed at moving from a needs-based strategy to one that is focused on rights, community involvement and empowerment, where persons of concern are placed at the centre of decision-making in relation to both energy and environmental issues. The participation of all refugees, host communities and other Persons of Concern will be sought to ensure

that their views are considered in the design, delivery, monitoring and evaluation of all UNHCR energy and environment programmes.

The inclusion of the host communities is in the spirit of the ReHoPE strategy that seeks peaceful co-existence between refugees and host communities. Host communities within a 20km radius of settlements are expected to benefit from energy and environmental interventions being rendered to refugees.

Access

The provision of solar street lighting, the construction and use of energy efficient stoves, as well as tree planting in compounds, in fields and along boundaries will be promoted to provide at least a partial solution to some immediate energy needs, while adding multiple benefits through environmental enrichment and livelihoods support. Solutions considered in this Strategy aim to resolve social tensions over access to increasingly limited natural resources while at the same time bringing tangible benefits to households and individuals.

Sustainability

In order to ensure sustainability, environmental education, capacity building and awareness raising campaigns on energy efficiency and natural resource management will be conducted for refugees, host communities, UNHCR's partners and UNHCR staff to foster their competencies, skill sets and ownership of the interventions. Specific training will be provided on the construction, operation and maintenance of any new technology being supported.

Community participation will be encouraged and enabled at all stages of Strategy implementation to ensure that the views and concerns of all the stakeholders are incorporated to foster ownership.

Community empowerment

Consultations will be conducted with relevant stakeholders at both the local and national levels to ensure that their views, opinions and concerns are taken into consideration. Refugees and host communities will participate in all stages of project development, from needs assessments to monitoring and evaluation. Local artisans and skilled community members will be identified and trained on the installation, operation and maintenance of promoted technologies, creating employment for youth and others.

Improved access to energy will facilitate businesses and other economic activities and enable social/recreational activities to be undertaken, even during the night. Production of improved biomass energy technologies (cookstoves and fuels) is an income-generating activity capable of growing into a full blown industry with well-known downstream benefits, potentially employing hundreds of youth and women. For instance, having small enterprises acquire production and distribution franchises

from large producers can provide a win-win relationship that ensures that both do business producing and selling good quality products to a satisfied customer base for the long-term. This Strategy also suggests the formation of stove/fuel entrepreneur associations.

The provision of energy to community centres will impart new IT skills and connect refugees to the global economy and a wealth of knowledge and information.

Appropriateness and reliability

This Strategy will consider only appropriate and proven technologies for promotion and application, with due consideration for innovation, socio-cultural needs and preferences, and environmental and economic factors. Specific surveys and baseline assessments will be undertaken to determine the most appropriate and realistic solutions to cooking and lighting, information which will in turn be translated into broader programming. Further, this strategy suggests using energy value chain approach that is closest to rural based communities and is likely to receive social acceptability, compared with other forms of energy available to the country. In addition, participation in the value chain has the potential to reduce poverty and create conditions for wealth generation.

2.2 STRATEGIC OBJECTIVES

This Strategy aims at balancing the demand and supply of safe and clean energy for social, economic and environmental development. Key players from government, civil society organisation, research institutions and the private sector have been involved in its development, together with other UN agencies and the intended beneficiary communities.

This Strategy is anchored on the following four objectives:

1. Improved household access to fuel-efficient technologies and renewable energy.
2. Improved access to fuel-efficient technologies and renewable energy at institutions within and around settlements.
3. Energy considerations integrated into UNHCR emergency preparedness and response plans.
4. Community-based management of woodlots and multi-purpose plantations enabled and managed, in and around settlements, for income generation, fuel supplies, food security and environmental rehabilitation.

2.3 STRATEGIC APPROACHES

The afore-mentioned strategic objectives will be achieved through the following integrated approaches:

2.3.1 Partnership and Co-ordination

To achieve improved access to safe and clean energy in a cost-effective and efficient manner, as well as reach a critical mass of refugees and members of the host community, UNHCR will strengthen and diversify its partnerships at both local and national levels so as to exchange competencies and expertise, assign responsibilities and seek resources to ensure complete implementation of this Strategy. Such partnerships – to include multi-lateral and bilateral donors, the public and private sectors, civil society, and academic, financial, and research institutions – will focus on research, advocacy, fundraising, capacity building and outreach, strengthening energy service delivery and improving the quality of energy products and services.

Since energy is a cross-cutting issue and spans many sectors, multi-sectoral co-ordination and multi-stakeholder engagement is essential for the smooth operation and realisation of the benefits of these partnerships. UNHCR's co-ordination will occur at three stages:

a) donor co-ordination, which is driven by donors;

b) aid co-ordination, which requires proactive engagement of government counterparts in relation to improved aid forecasting, accounting and aid management systems; and

c) development co-ordination, where the government leads in policy design and implementation, and sets up effective mechanisms for managing government resources and engagement with the community of partners.

UNHCR will also engage with, and participate in, energy and environment networks, alliances and other forms of collaborative arrangements, in particular with Uganda's national development planning, governance structures and systems as enshrined in the ReHoPE and STA strategies.

2.3.2 Capacity building

Based on a series of capacity and needs assessments, bespoke trainings will be provided to UNHCR and partner staff, local governments, refugees and host community members on energy efficiency and natural resource management. Capacity building will consist of three core activities:

(i) building and revitalizing local environment structures and systems to deliver effective, appropriate and sustainable energy and natural resource management programmes;

(ii) building partnerships and organisational capacity to sustain energy and natural resource management programmes; and

(iii) mainstreaming energy and environmental issues into all activities in order to build community resilience.

To achieve this, some key training areas envisaged include: community environmental action planning, productive use of energy for livelihoods and agricultural diversification; development of woodlot/forest management plans, stove construction and repair; establishment and management of community structures; participatory monitoring and evaluation; management of energy systems such as solar powered facilities, savings and credit associations, the production and use of mud bricks and/or inter-locking stabilised soil blocks, community forestry in relation to carbon financing and bee-keeping. In addition, livelihood improvement will be fostered through productive use of energy throughout the agricultural value chains.

2.3.3 Communication and Advocacy

Communication and advocacy will be undertaken at local, national and international levels to raise awareness on energy efficiency and natural resources management, catalyse social and behavioural change, assist in the delivery of resources and services by placing energy issues high on the political and development agenda, mobilise resources and to strengthen community participation for sustainability and self-reliance.

The core of intended advocacy work will be engaging and forming partnerships with UN agencies, central and local governments, the media, private sector, civic and cultural institutions, and civil society organisations to mobilise political support and resources for energy and environment management efforts. This will be done through some of the following as the situation will warrant: press conferences; news coverage; television and radio talk shows; soap operas/drama; summits, conferences and symposia; celebrity spokespeople; and meetings. Specifically, refugees and host communities will be encouraged to discuss, debate, organise, and communicate their own perspectives on issues of energy and natural resources management through group and community meetings, open forums, environmental clubs, participatory theatre, road shows, videos and participation in events such as energy week, environmental day, forestry day etc.

UNHCR Uganda will use social media such as the global UNHCR Twitter and Facebook accounts as well as the energy and environment web page when its development is completed; to highlight achievements and share success stories and lessons learned in implementing energy and environmental programmes in the country.

2.3.4 Integrated approaches

Energy and environment issues are integral concerns in UNHCR's protection mandate and must not be viewed in isolation but as part of a wider programme of response. Synergies need to be established, and maintained, through this strategy in relation to waste management, WASH, education, health, livelihoods, nutrition and shelter, among others.

a. **Protection:** Ensuring that all households have safe access to cooking fuels will significantly reduce the risk of exposure to violence, while safer cooking systems will reduce the risk of fire from kerosene lamps and candles. Better lit public spaces will also mean that people can move more securely during the night.

b. **Education:** Reliable and efficient lighting in schools, paired with the provision of solar lanterns in all households, will improve attendance by children and enable them do their homework even after dark. Also, by removing the requirement for some children to skip school in order to collect firewood, school attendance will increase and enable all children to study.

c. **Health:** Peoples' health is expected to improve through the use of energy-efficient cooking stoves, with significantly lower levels of indoor air pollution being experienced. Assistance will also be provided to ensure proper ventilation of cooking areas. Hospitals and health centres will be installed with solar facilities that provide not only lighting, but also for sterilising equipment and providing hot water.

d. **Environment:** The provision and use of energy-efficient stoves will significantly reduce the amount of firewood – and any other biomass residues – used for cooking. Such actions will consequently reduce the pressure on woodland resources and help reduce greenhouse gas emissions such as carbon monoxide caused by poor combustion. Trees will also be planted and woodlots established for purposes of restoring degraded areas in and around settlements.

e. **Shelter and settlement:** Trees planted within and around settlements will act as wind breakers and provide shade for households. Currently, refugee settlements have shelters constructed primarily out of wood, thatch and plastic and are close to each other: the widespread use of open fires for cooking represent a constant risk of house fires. Providing fuel-efficient cookstoves and clean fuels as well as ventilated kitchens will significantly reduce the risk of household fires, injuries from burns and indoor air pollution. Furthermore, semi-permanent structures made of mud bricks or ISSB and iron sheets will be promoted to reduce the use of poles for construction as well as reduce the risk of house fires.

f. **Nutrition**: The use of energy efficient stoves and energy conservation through employing proper cooking techniques, such as pre-soaking beans, using tight-fitting lids and sheltering cooking fires from wind, etc. will be promoted to keep the consumption of cooking fuel to a minimum. Consequently, this will enable households and individuals to: adequately cook; not skip their meals and not sell their food rations to buy fuel and consequently, reduce the risk of foodborne illness. In addition, planting fruit trees such as citrus, jackfruits, mangoes and other multi-purpose trees such as *Moringa oleifera* will provide additional necessary nutrients/vitamins for the body.

g. **Livelihoods:** Having access to clean and reliable energy will enable both existing and upcoming local businesses to reap the benefits of extended operating hours, mechanisation, product preservation, higher productivity, improved working conditions, communication and education in a socially and environmentally sustainable way. For instance productive use of solar powered water pumps for irrigation will increase agricultural production. Also, the provision of energy enables the diversification of the economic base by making it possible for the local community to both deepen and move beyond traditional economic activities. The introduction of sustainable energy can equally create jobs for different levels of qualifications as the renewable energy equipment needs to be installed, operated and maintained, as well as indirectly,; for example, an entrepreneur may purchase a PV panel to start a business charging mobile phones. The jobs and businesses thus created or maintained generate income, leading to an increased purchase power of the local community. Entrepreneurial activity varies but often include agro-processing, electronics charging stations, general shops, restaurants, repair shops, salon/barber shops etc. Furthermore, livelihoods are also improved when there is additional money available especially by poor households as a result of savings from fuel purchases

In addition, the planting and sale of fruit trees might improve household income. Other forest-based enterprise such as bee keeping could become an additional source of income for some households as demonstrated in Box 3**.**

Box 3: Bee keeping

Luka, a 60-year old male refugee from South Sudan, and a resident in Mungula Refugee Settlement, West Nile, grows crops and vegetables for domestic consumption and sale on the acre of land allocated by government. He supplements his food and income sources with bee keeping, an activity he practised in his native country. Luka received training on modern bee keeping practices from the Danish Refugee Council.

In one season, Luka harvests on average 360kg of honey which he sells for about US$551(UGX1,651,000), compared withUS$28 (UGX85,600) that he gets from the sale of vegetables. Proceeds from the sale of honey helped buy small solar panels that he uses for lighting and phone charging. "I have light in my house…, my children can revise and do their homework. I do not have to take my phone to the trading centre for charging at a cost of UGX 500," said a visibly happy Luka

h. WASH: The use of solar-biogas hybrid systems[3] instead of diesel generators will reduce the costs of water pumping. For instance, US $ 30,000 annually is spent for pumping water in South-West refugee settlements. In addition, the generation of biogas from pit-latrines especially at institutions will help in safe disposal of human wastes. Currently, energy costs make up a large proportion (about 65%) of the price of clean water and therefore improving access to modern energy could lower this cost of water delivery and thus improve the lives of many refugees and host communities.

2.3.5 Innovation

UNHCR will establish strategic public-private partnerships with academic and research institutions and other development and humanitarian actors with expertise in energy and environment. Specifically, partnerships with renowned organisations in clean cookstoves and climate financing will be established. Knowledge sharing and co-operation with the UNHCR Innovation Unit will be sought in adopting and applying new technologies and approaches for energy-related programming. In this regard, UNHCR Uganda will adopt an energy value chain[4] approach (see Figure 8) in order to ensure innovations, and to better understand issues in the energy chain and devise interventions accordingly. This will also help make the private sector aware of investment opportunities in efficient technologies and the renewable energy sector as a whole.

Figure 8: Energy value chain

A full understanding of the energy value chain (practices, price and market structures and consumer preferences) within government institutions and market players will lead to the incorporation of financial and economic realities. Value chain analysis will identify the activities to be performed in order to deliver energy from source to consumer. The value chain will vary by fuel, by region and between rural and urban areas. Understanding the dominant energy value chains will ensure that the right processes and stakeholders are included and ensure productive use at various stages along the value chain.

[3] (see http://cleantechnica.com/2014/12/04/aora-slates-first-grid-solar-biogas-hybrid-electricity-plant-ethiopia/)

[4] A value chain is an economic system that can be described as a sequence of related business activities (functions), ranging from the provision of specific inputs for a particular product to primary production, transformation and marketing, right up to the final sale of the particular product to the consumer.

2.3.6 Measurement

Comprehensive baseline assessments will be undertaken in all settlements to enable monitoring, reporting and evaluation of energy interventions as well as facilitating energy-based programming for both refugees and host communities.

This will involve assessing household and institutional energy needs in terms of cooking and lighting on a weekly and monthly basis. The condition and quantity of biomass available within a 50km radius of settlements and the extent of this which could be accessible to the humanitarian operation will be assessed. Market assessments/surveys will also be done to determine the most appropriate and applicable energy options, technologies and alternatives in the quest of switching from traditional biomass and inefficient stoves to more efficient, cleaner and safe energy systems. Further, a results-chain shown in figure 9 below will be used to track progress made.

Table 9: Results-chain

3.0 PLAN OF ACTION

This plan of action provides a summary of needs and schedule for implementation of activities that are expected to be conducted to achieve each strategic objective. It also shows the output, and indicators for measuring progress and budget to effectively implement the anticipated activities.

Activities	Output	Indicator	2016				2017				2018				2019				2020				Location	Responsible	Budget (US $)
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			
PRELIMINARY ACTIVITIES																									
Recruit an Environmental coordinator/energy officer	Qualified and competent staff recruited for enhanced service delivery	One staff employed																					BOK	UNHCR	454,285
Conduct a detailed baseline survey on energy and environment	Baseline data generated	# of baseline survey conducted																					All settlements	Programme Unit	200,000
Develop and implement a training program on energy & environmental issues	Enhanced capacity of UNHCR and partners to implement energy and environmental programmes	# of staff and refugees trained																					BOK and field offices	Programme Unit	750,000
Establish a steering committee on energy & environment	Functional and effective steering committee in place	# of coordination meetings held																					BOK	Programme Unit	75,000
Strategic Objective i & ii: Improved household and institutional access to fuel-efficient technologies and renewable energy																									
Sensitization, awareness raising and training on	Knowledge and understanding on energy efficiency and	# of trainings and sensitization sessions held,																					All settlements	Programme Unit	2,500,000

energy efficiency and conservation	conservation gained																								
Distribution & installation of selected household and institutional energy efficient technologies for cooking and lighting e.g. hydropower, solar and biogas	Safe and clean technologies are adopted, used and maintained by refugees	Percentage of households & institutions having access to renewable energy technology (cooking or lighting)																						All settlements	Programme Unit, Community services, IP, DLG, OPM, refugee and host community leaders	4,700,000
Conduct R&D into energy-efficient appliances and investigate their suitability for use by refugees	"Technology watch" for new fuels or appliances that come onto the market	Inventory of new fuels and appliances																							Programme Unit, Community services, IP, DLG, OPM, refugee and host community leaders	300,000
Introduce complementary activities to further reduce woodfuel consumption (e.g. energy-saving cooking practices).	Reduced use of woodfuel	Report on adoption of energy saving practices																						All settlements	Programme Unit, Community services, IP, DLG, OPM, refugee and host community leaders	100,000

Promote appropriate alternative fuels for household, institutional or small scale industrial use (briquettes, solar, hydropower, biogas, and the required cookers	Improved access to safe, clean and renewable energy	# of alternative fuels promoted																					All settlements	Programme Unit, Community services, IP, DLG, OPM, refugee and host community leaders	2,500,000
Tackle bottlenecks to the uptake of alternative fuels	Improved adoption and use of alternative fuels	# of households using alternative fuels																					All settlements	Programme Unit, Community services, IP, DLG, OPM, refugee and host community leaders	150,000
Conduct capacity building training to UNHCR and partner staff, as well as refugees	Enhanced capacity of UNHCR and partners to implement energy and environmental programmes	# of staff and refugees trained																						Programme Unit	1,500,000
Monitoring and evaluation	Monitoring and evaluation report	# of monitoring visits held																					All settlements	Programme Unit, Community services, IP, DLG, OPM, refugee and host	150,000

																								community leaders	
Strategic objective iii: Potential energy needs of refugees integrated into emergency preparedness and response plans of UNHCR and partners																									
Develop an energy emergency and response plan for UNHCR	Concrete actions to meet energy needs are included in emergency response plans.	Amount of contingency funds allocated to energy, # of Energy equipment (ESS, lanterns etc) distributed as NFIs																						UNHCR Supply and logistics Unit, programme unit	50,000
Develop emergency procurement guidelines for energy	Energy kits are available at the outset of an emergency	Emergency procurement guidelines in place																						UNHCR Supply and logistics Unit, programme unit	1,450,000
Identify suppliers and assess their capacities to supply energy products	Service contracts and partnerships are established to ensure availability of energy kits such as stoves, lanterns etc.	# and names of selected suppliers, Supplier selection criteria, technical specifications developed																						UNHCR Supply and logistics Unit, programme unit	15,000
Conduct a quick energy consumption and impact assessment	Energy consumption rate and potential impacts are established	Consumption and impact assessment report																						Environment Officer, Programme unit, community services	35,000

Monitoring and evaluation	Compliance to emergency energy requirements is assessed	# of monitoring visits held																					All settlements	UNHCR (Programme Unit, Community services), IP, DLG, OPM, refugee and host community leaders	250,000
Strategic Objective iv: Promote Community Based management of woodlots and multi-purpose plantations in and around the settlements for income, fuel, nutrition and food security																									
Sensitization and awareness raising on community forestry and sustainable land management (SLM)	Knowledge and understanding on forestry and SLM gained	# of awareness campaigns held; % of households with basic knowledge on natural resources conservation																					All settlements	UNHCR (Programme Unit, Community services), IP, DLG, OPM, refugee and host community leaders	500,000
Develop settlement specific wood fuel supply master plan (including tree cover inventory, classification of harvesting zones, analysis of wood fuel flows, development of conditions and technical	Wood fuel supply master plan developed for each settlement	# of wood fuel supply master plans developed																					All settlements	Environment Officer, IP, DLG, OPM, refugee and host community leaders	150,000

specifications for sustainable charcoal production)																							
Establish management structures at settlement level, plus additional support schemes such as training	Improved ownership and empowerment of local communities	# of functional management structures																				All settlements	UNHCR (Programme Unit, Community services), IP, DLG, OPM, refugee and host community leaders	500,000
Promote environmental rehabilitation; and tree planting through agroforestry	Increased productivity of forest resources	# of hectares planted; # of hectares rehabilitated																				All settlements	UNHCR (Programme Unit, Community services), IP, DLG, OPM, refugee and host community leaders	800,000
Promote the use of improved, low-cost charcoal making technologies for informal producers (e.g. improved kilns).	Improved efficiency in charcoal production	# of improved charcoal kilns established																				All settlements	UNHCR (Programme Unit, Community services), IP, DLG, OPM, refugee and host community leaders	500,000

Conduct tree species-site matching	Improved tree survival rates	Tree-species site matching report																						All settlements	DLG,IP	
Conduct CEAPs and land use planning	Proper and efficient use of land	# of CEAPs developed																						All settlements	Environment Officer, IP, DLG, OPM, refugee and host community leaders	750,000
Introduce and promote the use of mud bricks and/or Interlocking Soil Stabilized Blocks (ISSB) for house construction	Reduced use of poles for construction	# of mud/ISSB structures constructed																						All settlements	UNHCR (Programme Unit, Community services), IP, DLG, OPM, refugee and host community leaders	450,000
Promote forest based enterprises such as apiary	Improved and diversified livelihoods	# bee hives , Kg of honey harvested, amount of money earned from sale of honey																						All settlements	UNHCR (Programme Unit, Community services), IP, DLG, OPM, refugee and host community leaders	200,000
Develop management plans for new and already established woodlots	Sustainable harvesting and management of woodlots	# of management plans developed																						All settlements	Programme Unit, Community services, IP, DLG, OPM, refugee and	400,000

																							host community leaders	
Monitoring and evaluation	Effective monitoring and evaluation system	# of M&E visits conducted																					Programme Unit, Community services, IP, DLG, OPM, refugee and host community leaders	250,000
Total																								**19,679,285**

4.0 FROM STRATEGY TO ACTION

4.1 INTRODUCTION

As described in the Plan of Action, this Strategy is a deliberate attempt to ensure that environmental and energy needs of both refugees and host communities are integrated in all of UNHCR's Operations in Uganda. Its multi-faceted and multi-stakeholder approach will ensure that strategic objectives are translated into implementable activities that are appreciated and owned by all the concerned parties, thus fostering sustainability. This Strategy also seeks to ensure that energy and environment are given priority in terms of allocation of funds.

This Strategy stipulates various management activities necessary to set the Plan of Action into motion, such as filling the human resource gap through recruiting an Environment Officer, and establishing a monitoring and evaluation system.

4.2 PARTNERS

No.	Partners	Area of intervention	Scope	Type of partner
1	OPM	• Co-ordination of activities in settlements • Registration of refugees • Provide security and regulations • Negotiate and allocate land to refugees	All refugee settlements	Government counterpart
2	District Local Government	• Implements projects/ programmes on energy, environment, health, community services, education etc. • Capacity building on energy and environment	District	Implementing partner
3	Nsamizi	• Tree planting • Sensitization and environmental awareness • Energy efficiency and conservation	South-west settlements	Implementing partner
4	Inter-Aid Uganda		Mid-west settlements	Implementing partner
5	Action Africa Help			Implementing partner
6	Lutheran World Federation		West Nile settlements	Implementing partner

7	Danish Refugee Council			Implementing partner
8	Deutsche Gesellschaft für Internationale (GIZ)	• Sensitisation and environmental awareness • Energy efficiency and conservation • Energy saving stove quality assurance and standards	Countrywide	Operating partner
9	Save the Children	• Tree planting • Sensitization and environmental awareness • Sensitization on energy saving stoves • Construction of energy saving stoves		Operating partner
10	Welthunger hilfe			Operating partner
11	World Vision			Operating partner
12	Adventist Development and Relief Agency (ADRA)		West Nile	Operating partner
13	American Refugee Council			Implementing partner
14	Agency for Co-operation and Research in Development (ACORD)			Operating partner
15	Finnish Refugee Council			Operating partner
16	China National Offshore Oil Corporation (CNOOC)	Tree planting in refugee hosting districts of Mid-West	Albertine Graben	Operating partner
17	CREEC	• Testing of stove efficiency • Research and development in energy • Innovations		Operating partner
18	UNDP	• Supporting countries in their development path • Coordinating the UN System at the country level.		UN agency
19	UNFAO	• Agricultural production • Food security		UN agency

		• Nutrition		
20	Uganda Carbon Bureau	• Climate/carbon financing		Operating partner
21	GVEP	• Poverty alleviation through increased access to sustainable, renewable energy • Support the development and growth of small and medium-sized enterprises that deliver energy products and services to the poor		Operating partner
22	World Food Programme	• Provides food assistance during emergencies and on a long-term basis • supports economic and social development of countries in need through technical assistance		UN agency
23	DfID	• Provide development assistance which contributes to poverty reduction		Development partner
24	World Bank	• End extreme poverty • Boost shared prosperity		Development partner
125	USAID	• End extreme global poverty • Enable resilient, democratic societies to realize their potential		

4.3 MONITORING AND EVALUATION

At the country level, participatory monitoring and evaluation processes, including appropriate indicators and reporting systems will be developed to determine the impact of the SAFE Strategy to the protection of refugees and the well-being of both refugees and the immediate host communities. Key to this will be the collection of comprehensive baseline data and information, and the development of indicators during the roll-out of this Strategy. Joint quarterly monitoring visits, field surveys/assessments and reporting will be done by UNHCR Field Officers, partners, refugees and host community leaders.

Existing information systems, methods, indicators, and techniques used within FOCUS will be adapted, where necessary, to strengthen monitoring and evaluation. This will enable knowledge capture, and the identification of best practices and lessons learned which will be shared within and outside UNHCR to foster evidence-based programming.

4.4 FUNDING

Implementation of this Strategy, for the period 2016-2020, requires a total amount of about US$ 20 million. This will require a judicious fundraising drive. However, because of the modular approach designed in the plan of action, donor support will be sought based on their specific areas of interest. Funding will also be leveraged through climate financing by linking the energy saving stoves, briquette use, renewable energy technologies and tree planting to Clean Development Mechanism and other Voluntary carbon schemes such as the Gold standard, Plan-vivo, Verified Carbon Standard etc.

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