



# Access to Clean Energy for refugees

## Uganda Case Studies

### BACKGROUND

The Republic of Uganda is a landlocked country spanning 241,038 km<sup>2</sup> in East Africa, bordered by Kenya, Tanzania, Rwanda, the Democratic Republic of Congo and South Sudan. Uganda is in the African Great Lakes region and the Nile Basin, and it has a very diverse geography with volcanic hills, mountains, glaciers, tropical landscapes and deserts, and extensive natural resources such as fertile soils, water and minor deposits of minerals and oil. The country is inhabited by a population of over 44 million as of March 2022, which is growing at an annual rate of 3.7%.

Uganda is the largest refugee-hosting country in Africa, with currently over 1,4 million displaced people, with 98% being refugees and 2% asylum seekers. Most are from South Sudan (852,690), followed by the Democratic Republic of the Congo (456,211), Somalia (55,579), Burundi (48,871) and others (158,175). There are several refugee settlements and camps, with the vast majority of those forcibly displaced living in settlements alongside local communities. Nearly 50% of displaced populations are in the largest settlements of BidiBidi, Nakivale, Kyangwali and Rhino camp, in the southwest and northwest regions of the country.



A solar street light is installed at Bidibidi refugee settlement in Yumbe district of Northern Uganda.

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## MAP: REFUGEE SETTLEMENTS IN UGANDA

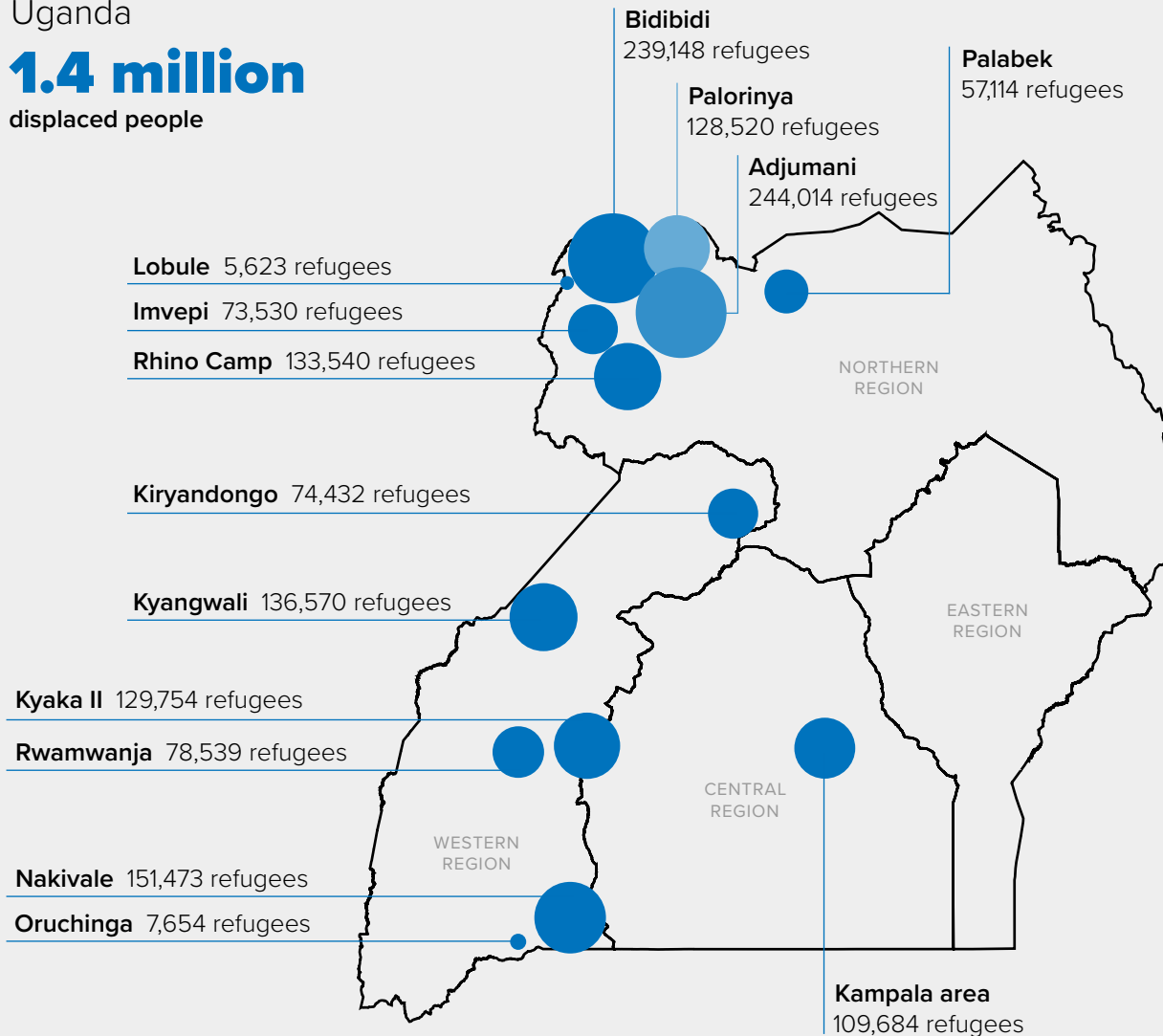
as of 31 December 2021

### Persons of Concern

Uganda

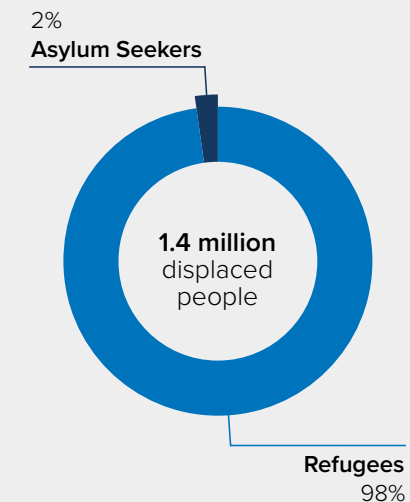
# 1.4 million

displaced people



Uganda has a progressive refugee policy, enshrined in the 2006 Refugee Act and the 2010 Refugee Regulations, serving as a model for other countries in terms of innovative policies for refugee inclusion. For example, Uganda's legal framework grants internally displaced persons (IDPs) the right to work, start a business, own property, access government services including primary and secondary education, and participate in health care. Uganda has one of the lowest per capita electricity consumption rates in the world with 215 kWh per capita per year. The average consumption in Sub-Saharan Africa is 552 kWh per capita and the world average is 2,975 kWh per capita. In Uganda, around 15% of the population has access to energy, of which 24% is consumed at household level. Only one-third of the population has access to electricity, with urban areas much better connected (58%) than rural areas (18%). Only 1% of the population has access to clean cooking.

Numerous energy access interventions were successfully implemented in displacement contexts, however further programmes are required to improve the current state, which is 97% of refugees using firewood for cooking and having to walk 4-10 km to collect it. 50% of South Sudanese and 69% of Congolese and Burundian households lack access to clean renewable energy. About 30% of health centres do not have a source of electricity, while another 30% use diesel generators.





## Charcoal briquetting

Briquettes are locally produced by refugees as well as host community members and are used for cooking as an alternative to firewood and charcoal. The production of carbonized briquettes is a long-existing approach to increase the energy value of biomass and to make use of biomass residues or charcoal powder.

Around **70,000 tons** of briquettes are produced per year by groups in various settlements



1 kg of briquettes run a cookstove **much longer** than 1 kg of firewood

Raw materials are sawdust, wood, maize, cereals, roots, cane sugar, coffee residues, organic waste

A typical household uses **1–2 kg** of briquettes daily

Price range from **USD 0.18** (household production) to **USD 0.55** per kg (private sector production)

## Local production of cookstoves



Refugee and host community members are trained to manufacture portable and non-portable improved cookstoves from local materials, as well as to maintain and repair the devices. The clay-made cookstoves are twice as efficient as traditional open three stone fires and increase safety during cooking.

The raw material is available locally and the set-up cost is low. Community involvement allows for custom made design to fit the local needs.

Cookstove fuel efficiency of **20–25%**



User-centered design increased the acceptability



Significant **health benefits**, reduce indoor smoke **by 90%**

Firewood or charcoal fuel need **cut in half** to 0.85 kg/per person per day

Price range of **USD 1.40–USD 4** per cookstove



## Solar lamp lifecycle and market

UNHCR distributed more than 300,000 solar lanterns to new arrivals from 2016 to 2021. To broaden access to sustainable lighting, eight energy kiosks were set-up in various settlement selling high-quality solar lanterns and other energy products. The energy kiosks also serve as an innovative and integrated electronic waste management point for the repurposing, recycling and adequate disposal of solar products.

Energy kiosks sell solar lamps at an average price of **USD 10**

**No operational costs**, phone charging possible with solar lamps

Energy kiosk operated by 10 to 15 refugee/host community members and serving **3,500 households**



**60%** reported to **feel safer** using WASH facilities at night



Energy kiosks as **central element in e-waste management**, as contact point for warranty claims, repairs and recycling

## Solarization of health facilities



Mini-Grids of typically 10 kVA or higher output allow health facilities in settlements and camps to operate high-capacity appliances and machines such as refrigerators, medical equipment or ICT equipment, thereby significantly improving the quality of health care. The health facility owns the mini-grid and can sell excess electricity to community members, making the solution more affordable.

Solar mini-grids can **reduce costs by 32%** compared to diesel-based electricity supply in the long run



Grid-like quality of electricity supply with **95% reliability**, compared to national grid with **50-75%**

Solar mini-grid implementation should be accompanied by electronic waste management plan

**Health care significantly improved** and made available to an estimated 60,000 refugees and more than 10,000 host community members

Cost for electricity from a solar mini-grid generally lower than the national ceiling tariff of **0.3 USD/kWh**