



# Access to Clean Energy in Displacement Settings Ethiopia

The Federal Democratic Republic of Ethiopia is a landlocked country in East Africa with a total size of 1.1 million km<sup>2</sup>, split by the Great Rift Valley. With about 117 million inhabitants of different ethnic groups and languages, Ethiopia is Africa's second most populous nation after Nigeria. While Ethiopia is one of the least developed countries in the world, its economy is growing fast, resulting in significant poverty reduction. Currently, there are 878,027 refugees and asylum seekers in Ethiopia primarily from South Sudan (407,382), Somalia (251,126), Eritrea (162,011) and Sudan (48,445). Most live in 24 refugee formal settlements spread across five regional states. Following recent conflict in the Northern Tigray region, around 4.5 million people are currently internally displaced, with another 1.5 million formerly internally displaced persons (IDPs) having returned home. Due to the history and ethnic composition of the region, the boundaries between refugees and local population are not always clear, with populations identifying fluidly with their own nationality.

Ethiopia is a signatory of several major conventions and human rights laws, including the Convention relating to the Status of Refugees (1951), its Protocol (1967) and the OAU Convention (1969). Based on these commitments, Ethiopia published a National Refugee Proclamation in 2004. Ethiopia implemented the Comprehensive Refugee Response Framework (CRRF) aiming to inte-

In 2017, UNHCR and the IKEA Foundation provided equipment for solar-powered grids to be established in Dollo Ado refugee camps. In a region increasingly affected by climate change, solar power answered the need for energy in the camps to be clean and sustainable, while the establishment of cooperatives to run them is generating much-needed income.

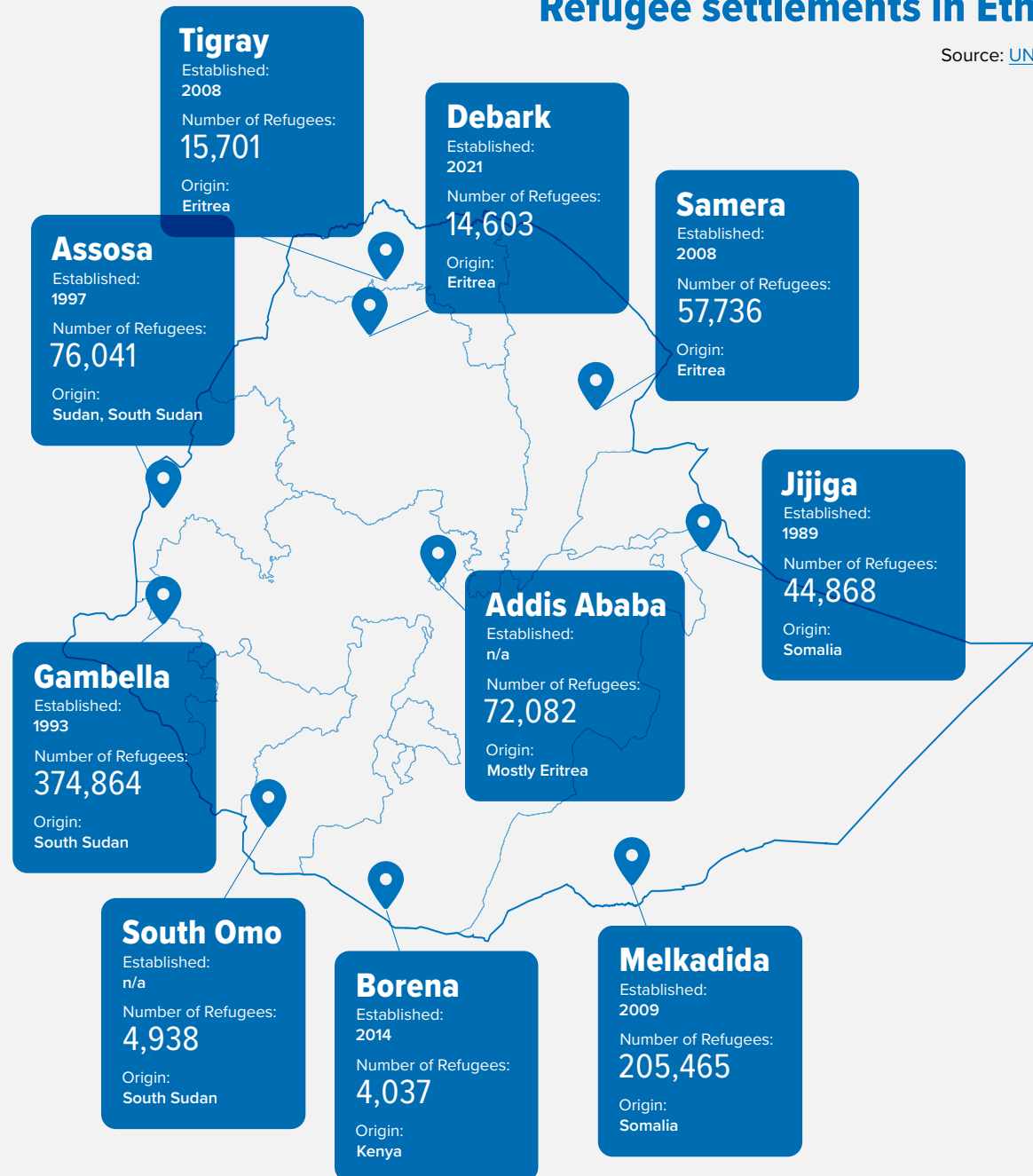
grate refugees in national efforts, infrastructures and services. In line with these efforts, its new Refugee Proclamation (2019) introduced a progressive set of rights and key initiatives, such as allowing refugees to obtain work permits and certain legal documents, and access primary education and financial services.

In 1994 Ethiopia ratified the United Nations Framework Convention on Climate Change, signed the Kyoto Protocol in 2005 and signed (2016) and ratified (2017) the Paris Agreement. The country's Energy Law (2013) supports energy market liberalization and green growth. The government aims to ensure 100% electricity access by 2025 and increase local electricity generation by 2037.

Ethiopia has one of the lowest rates of access to modern energy services, and energy demand is expected to rise in line with its economic growth. Presently, waste and biomass generate about 92% of the country's energy, followed by oil (6%) and hydropower (2%). Annually, Ethiopia only generates 9,000 GWh of local electricity -barely 2.5% of its hydropower potential. Only half of the population has access to electricity. Access is increasing due to the extension of the national grid and an increasing number of mini-grids and stand-alone systems being installed. Access to electricity for refugees is particularly low at 7% and is limited to lighting for a few hours per day. Households in Ethiopia strongly rely on biomass for cooking, with 70% of urban and 97% of rural households using firewood, charcoal, and solid biomass as primary fuels. Similarly, 85% of refugees primarily use firewood for cooking.

## Refugee settlements in Ethiopia

Source: [UNHCR, 2022](#)





## Biogas for cooking

In the Melkadida refugee camp, a biogas digester connected to a slaughterhouse and a school toilet converts waste into biogas for cooking. As part of the Productive Use of Energy (PUE) component of the programme, a cooperative uses the biogas to cook ready-prepared meals that are sold at the local market. The profits help maintain the biogas digester, as well as providing much-needed income to the cooperative's members.

- 10m<sup>3</sup> biogas digester system for commercial use
- Biogas production occurs automatically by processing organic waste from the slaughterhouse and school.
- Biogas is used for lighting inside the slaughterhouse and cooking in nearby restaurants.
- The biogas system is managed by a cooperative of 12 refugee and generates an income of USD 290 per month.
- Awareness raising activities are a critical part of the programme to address the misconceptions about biogas.



## Electrical communal kitchen

Since 2017, UNHCR has set up electrical communal kitchens connected to the national electricity grid. The programme makes use of the affordable electricity prices in the country, while offering clean cooking alternatives to firewood. The kitchens are adapted to local cooking habits and cultural practices.

- 24 communal kitchens connected to the national electricity grid serving more than 3600 households.
- In Ethiopia, 90% of the electricity from the national grid is sourced from renewable sources, especially hydropower, and the low costs (USD 0.006 per kWh) make electric cooking an attractive alternative to other type of fuels.
- Each kitchen has ten electric stoves or ovens, four kettles and lighting, as well as sinks, bins, hygienic dispensers, eating and shaded areas.
- Electricity for cooking is provided by UNHCR, while a committee manages opening hours and cleaning.
- Communal cooking represents a viable option both in emergencies and protracted situations, especially when fuels for private home cooking are scarce.

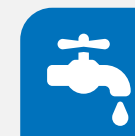




## Solar energy cooperatives

Solar-powered mini-grids, solar streetlights (SSL) and solar home systems (SHS) were distributed and installed in refugee camps in the Somali region throughout the past 7 years. These solutions are managed by five officially registered cooperatives, each comprising of half refugees and half host community members. These solar energy cooperatives serve a) meet and sustain the need for affordable and clean energy in Ethiopia, b) enhance capacity building, create jobs, generate income, and c) ensure a self-sustaining service to the community for the long term.

- The cooperatives are officially registered with local authorities and get working permits for its members, in line with the national legal framework.
- Each group member attends a three-month solar technical training at a local college before joining the cooperative.
- Six 150 kWp solar mini-grids serves 1,300 users. The initial investment is provided by grants, while the maintenance is covered by tariff revenues applied according to the appliances in use (e.g., 1 USD/month per bulb, 37 USD/month per fridge).
- 64 SHS distributed and installed by the cooperative (with UNHCR funds), while the households directly pay the cooperative for the after-sales repair fees.
- 1,100 SSL installed, repaired, and operated by cooperatives serving 70% of the Dollo Ado camps population, which further provides a monthly contribution for maintenance.



## Solar water pump for agriculture

To ensure a continuous water supply to meet the agricultural needs of farmers from both refugee and host community groups, UNHCR has set up in Melkadida camp a solar water pump system to replace the old diesel water pump. The farmers are part of an agricultural cooperative that manages the entire irrigation system (solar water pumps and the canal network) to supply individual plots. The solar pumps supply water at lower costs of the previous diesel pump, increasing production and incomes for both group of farmers.

- 56 kWp solar power water system (with two pumps) that operates every second day for four hours.
- The water is pumped from the river and streamed into a storage tank, that distributes the water via a gravity fed system.
- When operating, 3,600 litres of water is pumped per hour to supply 45 hectares of farmland.
- 90 farmers (45 refugee and 45 host community) form an agricultural cooperative that covers the cost of operation and maintenance (O&M) with revenues from the farmed crops.
- Two community technicians are employed for the O&M of the system and the irrigation canals.