

# ANNUAL REPORT 2023

## on Sustainable Energy



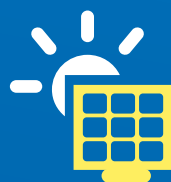
# KEY HIGHLIGHTS

## Office transition to solar energy



Construction of large solar systems has been completed in three UNHCR offices in **Kenya** and **Uganda**, and there is an agreement to start the transition in 11 offices in **Ethiopia**, **Mauritania**, **Nigeria**, and **Pakistan**.

## UNHCR solarised



**50%** water pumps  
**44%** health facilities

Solar energy now powers 50% of all water pumps and 44% of all health facilities UNHCR supports.

## Sustainable Electricity for Settlements

A study on planning sustainable electricity for refugee settlements in sub-Saharan Africa has been completed in collaboration with Utrecht University.



**4** countries  
link clean cooking  
and reforestation



**Rwanda**, **Sudan**, **South Sudan**, and **Uganda** have completed feasibility studies under the Refugee Environmental Protection (REP) Fund initiative to link clean cooking and reforestation.

**4+1** countries manage e-waste



Ongoing e-waste management activities are taking place in 4 countries (**Bangladesh**, **Ethiopia**, **Kenya**, **Uganda**) and initial planning in **Pakistan** for establishing repair facilities.

# KEY ACHIEVEMENTS

## AGAINST THE STRATEGIC OUTCOMES OF THE UNHCR GLOBAL STRATEGY FOR SUSTAINABLE ENERGY 2019-2025

### 1

#### Addressing energy needs during refugees' emergency response

**Access to energy** for cooking, heating, and lighting remained critical in emergency responses, provided through both in-kind and Cash-Based Intervention (CBI).

Based on the [2023 Emergency Preparedness and Response report](#), UNHCR issued 43 emergency declarations to scale up support in 29 countries to serve up to 16.7 million people worldwide who were assisted with 7.4 million relief items, with 7% being solar lamps and solar streetlights.



UNHCR and partners deliver core relief items to Sudanese refugees in Chad © UNHCR/Ying Hu

The largest energy-related items distributed during emergencies are solar lamps, appliances and fuel for cooking and heating, and solar streetlights. To respond swiftly to emergencies, distribution efforts provided **almost 525,000 solar lanterns to meet the basic lighting requirements of forcibly displaced people**. Additionally, in the last triennium, more than **7,500 solar streetlights were installed in various locations worldwide** as part of protective and safety measures. For example, since the conflict in Sudan erupted in April 2023, UNHCR distributed **15,000 FI (CRI) kits, including solar lamps**, and installed **22 solar-powered streetlamps** for improved safety and illumination in Chad. While in Syria, besides regular CRI distribution, UNHCR assisted **121,600 Syrian families with heating fuel as part of the winterization programme** after the February earthquakes. An additional 2,000 vulnerable households in Pakistan were provided solar lamps to the province affected by devastating floods in August last year.

Based on the output of the [Operational Strategy for Climate Resilience and Environmental Sustainability 2022-2025](#), aiming to have **solar lamps repaired and recycled in 12 country operations**, UNHCR collaborated with GIZ and GTH to develop an action plan and technical

procurement guidelines to improve e-waste management in humanitarian setting, with focus on **Ethiopia, Kenya, and Uganda**. Progress has been made in **Bangladesh** with the local training and e-waste repair centre called the 'Green Innovation Hub,' an initial discussion is being held to replicate the intervention in **Pakistan**.

## CASE STUDY: THE GREEN INNOVATION HUB IN BANGLADESH

The maintenance and operation (O&M) of solar energy systems in Cox's Bazar's Rohingya refugee camps pose an ongoing challenge, featuring 12,000 Solar Street Lights (SSLs), 10 solar mini-grids/standalone systems, and numerous household solar setups. To address this, the Green Innovation Hub and Agents of Change Innovation pilots were initiated from 2022-2024, aiming to localize O&M, offer skills development to refugees, enhance solar system functionality, and mitigate the harmful effects of electronic waste (e-waste). Phase one (2022-2023) focused on establishing e-waste processes in Kutupalong and Nayapara camps, constructing the "Green Innovation Hub" for refugee training in solar item repair. Progress includes community e-waste awareness and collection, engaging more than 4200 households (around 22,200 individuals), 10 tons of e-waste collected and responsibly recycled, and the hub equipped with solar training equipment. Phase two (2024-2025) aims to include community-led solar O&M and

training 40 refugee volunteers as Energy Ambassadors in various camps to repair systems and educate them on energy and the environment. The partnership involves UNHCR Bangladesh and NGO Forum for Public Health, collaborating with Schneider Electric, Electricians Without Borders, and GPA.



### ENHANCED FEATURES OF SOLAR LANTERNS

To reduce the environmental footprint of its humanitarian responses, UNHCR adopted more eco-friendly benchmarks for the specifications of solar lamps, including recycled (rather than virgin) plastic for the lamp casing and increased options for component replacements such as batteries and LED. This latter feature would enhance reparability and extend lifespan. Careful attention was paid to not compromising the overall performance of the new lanterns. At the end of 2023, UNHCR launched, in line with UNHCR's ongoing commitment to advancing the environmental and technical sustainability of relief items.

# 2

## Improving access to sustainable, safe, affordable, and clean<sup>1</sup> household cooking energy

The [UNHCR Global Strategy for Sustainable Energy 2019-2025](#) strives to empower refugees, host communities, and other vulnerable individuals to fulfil their energy requirements safely and sustainably. It also aims to address health, protection, and environmental issues arising from energy access. In alignment with this objective, UNHCR has embraced the WHO's definition of clean fuels, which assesses fuels based on their impact on and contribution to the health of the populations it serves and addresses progress towards the [Sustainable Development Goal Indicator SDG 7.1.2](#) related to access to sustainable energy.

In 2023, many operations undertook **efforts to increase access to clean cooking fuels**, such as in Rwanda, where almost 20,000 households benefitted from the distribution of Liquefied Petroleum Gas (LPG), and in Bangladesh, where 92,547 refugees received LPG from UNHCR. In Zimbabwe, a pilot project that started in 2022 to produce biogas from manure and organic waste was successful and has been scaled up in 2023. Moreover, country operations have continued pursuing a **transition from polluting fuels to cleaner alternatives**, such as biomass combined with improved cookstoves. For example, over 15 tons of char briquettes in South Sudan were locally produced and distributed to 580 households. In Rwanda, in addition to LPG distribution, refugees purchased 1'265 improved cookstoves and over 102'000 kgs of pellets locally. Similarly, in Ethiopia, Cash-Based Interventions have supported 1200 people in purchasing locally produced briquettes and 1000 vulnerable households in purchasing fuel-efficient cookstoves

### CASE STUDY: REP FUND

The **Refugee Environmental Protection (REP) Fund** initiative, announced at the High-Level Official meeting at the end of 2021, aims to provide sustainable, scalable, long-term funding for reforestation and clean cooking programs by linking their environmental benefits to global carbon markets. These benefits will be verified and monetized to create the first large-scale refugee-generated carbon credits. The Fund will also generate green jobs for refugees and host communities supporting reforestation and clean cooking supply chains. Feasibility studies initiated in 2022 for **Rwanda, Uganda, South Sudan, and Sudan** have been finalized at the end of 2023. Feasibility has been confirmed for three sites across two countries (Rwanda and Uganda), with a planned pilot targeting approximately 14,000 hectares of reforestation and serving 45,000 households with clean cooking solutions . These assessments will guide future studies for additional sites to be incorporated throughout 2024.



Construction of the biogas system in Zimbabwe. © UNHCR

## BIOGAS ZIMBABWE

In 2022, the UNHCR country operation in Zimbabwe embarked on biogas usage in the Tongogara refugee camp. Based on this experience, a large-scale biogas project was planned and is currently being implemented in Tongogara Refugee Settlement, with support from the [UNHCR Environment and Climate Action Fund](#). Four 40 m<sup>3</sup> prefabricated modular biodigesters will be installed next to Tongogara's refugee-operated pig farm. While the previous biogas projects were used to provide cooking energy to restaurants and a communal kitchen, this new biogas production from pig manure and organic waste will mainly benefit productive usages within the pig farm and neighboring agricultural site for radiant heaters, which increase the survival rate of both piglets and broiler chickens. In addition, water boilers, which supply the farms and the slaughter area with hot water, will also be using clean biogas fuel instead of traditional firewood. The digested manure from the biogas plant, also called bio-slurry, will be applied as fertilizer and soil conditioner in the settlement's agricultural fields to enhance the production of crops and vegetables.

## 3

### Expanding sustainable household access to lighting and connectivity

In 2023, UNHCR pursued its activities to increase household access to sustainable lighting and connectivity. In Zambia, an on-going project for grid extension in collaboration with the Zambian Government and REA, the national electrification company, will allow 40'534 individuals to access electricity from the grid. In Ethiopia, over 1'450 households can benefit from increased access to electricity thanks to the installation of six commercial mini-grids across the camps. Household access to lighting has also been facilitated through market-based approaches. In Rwanda, 774 solar home systems were purchased by refugees under the RE4R project while in Ethiopia over 1450 households are using solar home systems through a pay-as-you-go payment modality. Pakistan also received 2.1M in funding from BMZ, Global Affairs Canada, and other donors for distributing 26'870 solar home systems.

## STUDY ON SUSTAINABLE ELECTRICITY ACCESS FOR REFUGEES

In collaboration with Utrecht University, to estimate financial needs to connect sub-Saharan refugee settlements to solar mini grids: [Study on planning sustainable electricity for refugee settlements in sub-Saharan Africa](#) the study focuses on assessing the financial requirements for connecting sub-Saharan refugee settlements to solar mini-grids. Addressing the challenge of insufficient comprehension regarding energy needs among forcibly displaced populations, the research involves an extensive survey and analysis of traditional and satellite data. An annual electricity demand of 154 GWh is estimated, encompassing households, microbusinesses, and institutional loads. Techno-economic models project an upfront cost of over US\$1 billion, deploying solar photovoltaic mini-grids averting 2.86 MtCO<sub>2</sub>e emissions over two decades. A second phase then followed, to allow for more detailed energy assessment in specific country operations that express interest. In 2023 Utrecht University finalised data collection on energy access in refugee settlements in **Malawi, Uganda, and Zambia**.

# 4

## Expanding sustainable electrification of community facilities

In 2023, 39 communal facilities (11 schools and 28 health facilities) were newly solarized in Bangladesh, Ethiopia, Lebanon, Mauritania, Nigeria, and Uganda. In Kenya, the solarization of 7 health facilities and 33 schools that started in 2022 was finalized in 2023. The solarization process contributes considerably to the UNHCR Global Strategy for Sustainable Energy, which aims to increase the sustainable use of renewable energy sources to reduce carbon footprint. In 2023 the energy data collection in 26 country operations worldwide showed that 44% of health facilities are accessing solar energy, bringing the total number of solarised facilities to 218<sup>2</sup>, compared to 179 of 2022.

Tanzania, Zambia, and Pakistan were awarded 6 M USD in funds from various private and development donors to solarise 145 communal facilities (35 new health facilities and 110 schools) in the next triennium. This will significantly be improving the lives of the refugees and the environment, ensuring access to reliable and sustainable energy solutions for essential education and healthcare services while reducing carbon emissions.

Efforts to solarize water pumps have continued, with an increase of 66 boreholes, compared to 2022. Beyond the positive environmental effects, diesel-powered water pumps also have higher operating costs than solar solutions and leave remote field locations dependent on fuel deliveries.

## PROJECT FLOW

To enhance the climate resiliency of UNHCR's operations and to reduce the dependency on fossil fuels, UNHCR is accelerating the solarization of water systems through the innovative financing mechanisms of Project Flow. Project Flow funds the up-front capital cost of solar PV systems, which UNHCR operations pay back over multiple years using the savings achieved compared to diesel-powered systems. These paybacks enable the funds to revolve, facilitating the solarization of additional water systems. In 2023, feasibility studies were completed, and detailed solar designs were developed for 38 water systems and 10 healthcare facilities in Ethiopia, Mauritania, Rwanda, South Sudan, Sudan, and Zambia. Solarization of all these systems has the potential to reach 1.36 million beneficiaries and reduce carbon dioxide by ~2,000 tons/year.

## CASE STUDY: ENERGY PROJECTS HELP BOOST STUDENTS' ENROLMENT IN BALOCHISTAN

The Women's Technical Training Centre (WTTC) in Balochistan, Pakistan, faced challenges due to power cuts and high electricity costs, affecting enrolment and skill development for both refugee and Pakistani women. UNHCR stepped in, installing a solar system and providing equipment, resulting in an immediate increase in women's enrolment. The principal, Ms. Shabnam Naz, noted a capacity increase from 200 to 700 trainees. The WTTC aims to empower women through six-month courses, and the solarization initiative aligns with UNHCR's broader energy strategy in refugee-hosting areas. Through energy interventions and solarization, UNHCR has added more than 600 kilowatts of solar energy to schools, health units, water and sanitation facilities, and other community infrastructures in 2022, and approximately 4,000 kilowatts of clean energy in 2023.



Pakistan: Ms. Shabnam Naz, Principal of the Women's Technical Training Centre in Quetta. © UNHCR/Humera Karim/



# 5

## Transitioning UNHCR global office infrastructure to renewable energy sources<sup>3</sup>

UNHCR has an institutional priority under the [Strategic Framework for Climate Action Pillar 3](#) and to reduce UNHCRs CO2 emissions by at least 45% by 2030. The 2023 Greening the Blue Report provides details on the UN's environmental footprint – UNHCR's per-capita carbon footprint is 2.6 tonnes of CO2 per capita – well beneath the UN-wide average of 4.1 tonnes of CO2 per capita. Among its sister agencies, UNHCR continues to be at the forefront of key sustainability initiatives, such as:

### **Green Boxes :**

Smart energy metering systems installed in UNHCR's offices to consistently measure global energy consumption. UNHCR has installed Green Boxes in 422 offices locations globally (representing 527 buildings) so far, making us the frontrunners in the UN system Information from the Green Boxes is displayed in a [PowerBI dashboard](#). The Green Boxes have improved data accuracy through real time monitoring, data collection and visualization of emissions, energy, waste, and water across UNHCR.

### **Greening the Blue (GtB) and Green Data:**

UNHCR participates in the annual UN-wide Environmental inventory, which measures greenhouse gas emissions, water consumption, and waste production. Participation has increased from 100 offices in 2018 (GtB report, 2019) to 541 offices in 2022 (GtB Report 2023), representing 95% of UNHCR offices reporting. CO2 emissions have reduced from 97,136 tonnes in 2018 (as reported in the GtB report 2019) to 52,371 tonnes in 2022 (as reported in the GtB Report 2023). Information from the inventory is published annually in the [Greening the Blue Report](#), and in the [Greening the Blue PowerBi Dashboard](#).

### **Transition to Renewable Energy:**

Technical Feasibility Assessments for the transition to clean energy were completed in 92 UNHCR Offices in 14 operations and frame agreements for the provision of renewable energy systems and services signed with 5 global suppliers. In 2023, 3 UNHCR offices in Kenya and Uganda started the construction of large solar systems and once completed, will see approximately 20% savings on energy costs and receive more than 80% of their energy from renewable energy sources. A further 11 offices in Ethiopia, Mauritania, Nigeria, and Pakistan have agreements in place to transition to renewables in 2024, this is in addition to the existing UNHCR offices connected to green grids or with existing renewable energy systems installed.



# KEY ACHIEVEMENTS

## AGAINST THE STRATEGIC APPROACHES OF UNHCR GLOBAL STRATEGY FOR SUSTAINABLE ENERGY

### PARTNERSHIP AND COORDINATION

#### ESDS

In the Implementation of the [Global Compact on Refugees](#) and **Comprehensive Refugee Response Framework (CRRF)**, **UNHCR and GIZ** are partners in the [Energy Solutions for Displacement Settings \(ESDS\) programme](#), enhancing access to sustainable energy for refugees and host community in Ethiopia, Kenya and Uganda, while also providing technical support at the global level. The programme has benefitted 160,614 individuals with better energy services, more efficient energy access and various energy-related training.

#### Ethiopia

ESDS supported the National Multi-actor Cooking Energy Strategy (2022-2030) within host and refugee communities, overseeing its development and eventual adoption. It prepared for the implementation of market-driven initiatives, employing the User-Centered Design (UCD) approach to refine and improve cookstoves. Furthermore, the initiative established a Charcoal Briquette Producing Plant boasting a production capacity of 350 kg/hr along with corresponding market frameworks. In addition, it facilitated the electrification of three health centers in Gambella, guaranteeing access to quality healthcare services for over 140,000 refugees.

#### Kenya

ESDS partnered with Turkana County Government to set up the County Energy database and kickstarted the development of the Turkana County Energy Bill and associated regulations. The project maintained ongoing collaboration with private enterprises, achieving market-driven electricity services with over 2,200 mini-grid connections in Kalobeyei settlement, comprising 275 business connections, 1,929 households, and 17 social institutions. Further support facilitated the expansion of an existing mini-grid distribution network, reaching 228 new host community connections.



Business Centre serves soft drinks chilled in a solar powered fridge. Source: © Malaika Media/Nazil.

## Uganda

Through the collaboration of four energy kiosks and in partnerships with diverse private sector entities under results-based financing (RBF) schemes, approximately 16,500 enhanced cookstoves and 3,000 solar-based products (including lighting and charging solutions) were sold to refugees and host communities from 2020 to 2023. Furthermore, ongoing research into sustainable e-waste management in Uganda aims to stimulate the emergence of e-waste intervention initiatives.

## NORCAP

In 2023, NORCAP has continued its support to UNHCR programs through the deployment of **ten Energy Experts in 7 country operations (Chad, Kenya, Mauritania, Mozambique, Niger, Tanzania, Zambia)** and in the EHAGL regional bureau, providing technical capacity and complementing UNHCR resources in the support of sustainable energy program development and implementation.

**NORCAP Green Shift Project – Female Accelerator Programme 2023** - After two successful cohorts, in 2023 NORCAP Green Shift Project launched the third cohort for the Accelerator Programme to further scaling up our efforts to increase women participation in the Energy sector. This focus on female professionals with a background in renewable Energy, environmental protection, humanitarian development, and climate studies. The **four selected female professionals in Kenya, Niger, Tanzania, and Zambia** contributed both to the NORCAP's Clean Energy and Sustainable Response work and in the host organisation future Energy plans.



Aqsa and Hafsa study their lessons under the light of a solar lantern in Pakistan's Balochistan province. © UNHCR/Humera Karim

## CAPACITY DEVELOPMENT - GTH

The [Geneva Technical Hub \(GTH\)](#) provided technical support on Energy, Environment, Shelter, Settlement and WASH interventions to 16 Country offices in 2023. For example, the GTH Environment Expert conducted a **Rapid Environment Assessment in Mauritania** which identified the use of unsustainable biomass as the biggest environmental concern. The mission has identified the potential to scale up market-based access to LPG which will be further investigated in 2024. The GTH Energy Expert conducted an energy assessment of **one of the largest healthcare facilities in Kakuma, Kenya**, which allowed to identify that the inefficiencies of the existing solar photovoltaic systems are related to a limited operational and maintenance routine, undersized wiring, and load imbalances.

Together with the [Swiss Federal Institute of Technology Lausanne \(EPFL\)](#) and GTH experts, UNHCR has been developing two energy related programs: the **Greenhouse Gas Emission Estimation Calculator (GHG tool)**, and a **feasibility study on e-waste management in three selected Sub-Saharan country operations**. While the e-waste study will highlight potential e-waste management options and its costs, the GHG tool will serve UNHCR field operations in assessing GHG emission savings when shifting to alternative, more sustainable and modern technologies, and activities. For instance, the impact of solarizing facilities or boreholes can be estimated with this simple, user-friendly, and effective online tool. Both the GHG tool and the e-waste study will be finalized in early 2024.