EFFICIENCY FOR ACCESS

UKaid from the British people | Transforming Energy Access

IKEA Foundation

EMPOWERMENT THROUGH APPLIANCES

INSIGHTS FROM THE HUMANITARIAN ENERGY SECTOR

FEBRUARY 2024

Efficiency for Access Coalition

CONTEXT

This research aims to provide insights into the current level of engagement of appliance companies within the humanitarian energy sector. The report outlines key opportunities and barriers they face in serving displaced communities.

Notably, this narrative represents the perspective of appliance companies and does not reflect perceptions or viewpoints from the end users. This research is part of the Low Energy Inclusive Appliances (LEIA) programme, a flagship initiative under Efficiency for Access, funded by UK aid, from the UK government via the Transforming Energy Access (TEA) platform, and the IKEA Foundation.

Efficiency for Access is a global coalition working to promote high performing appliances that enable access to clean energy for the world's poorest people. It is a catalyst for change, accelerating the growth of off-grid appliance markets to boost incomes, reduce carbon emissions, improve quality of life and support sustainable development.

The study was designed and executed by Liya Bensy Thomas and Jakub Vrba from Energy Saving Trust. The authors would like to thank the following individuals who made valuable contributions to help improve the quality of the survey and the report by providing feedback throughout its development: Charlie Miller, Ellie Grebenik, Felicity Tolley, Chris Beland, Sheree Conibear, Jacqueline Garcia, and E Feng Tan Loh from Energy Saving Trust; Elif Demir from UNITAR's Global Platform for Action on Sustainable Energy in Displacement Settings (GPA); Oliver Reynolds from GOGLA; and Yasemin Erboy Ruff from CLASP. We would also like to thank Joseph Thomas from Energy Saving Trust for managing the online survey platform. Additionally, heartfelt thanks to Anita Smith, Kyle Rees, and Rachel Templeton for their invaluable contributions to designing the report.

The authors are immensely grateful to the following peer reviewers for their valuable inputs and feedback on this report: Philip Sandwell and Elif Demir from UNITAR's Global Platform for Action on Sustainable Energy in Displacement Settings (GPA); and Ben Robinson from Outsight International.

TABLE OF CONTENTS

ABBREVIATIONS

ARE	Alliance for Rural Electrification
GDC	Global Distributors Collective
GOGLA	Global Off-Grid Lighting Association
GPA	Global Platform for Action on Sustainable Energy in Displacement Settings
LEIA	Low Energy Inclusive Appliances
PAYG	Pay-as-you-go
RMT	Remote Monitoring Technology
UK	United Kingdom
UNHCR	United Nations High Commissioner for Refugees
USA	United States of America
USD	United States Dollar
WFP	World Food Programme (an Efficiency for Access Coalition donor)

DEFINITIONS

HUMANITARIAN SETTINGS

Entails areas affected by crisis or complex emergencies, encompassing settlements provided for refugees and internally displaced people

ELECTRICAL APPLIANCES

Includes all off- and weak-grid appropriate electrical appliances apart from solar lamps and solar home systems that only provide lighting and phone charging.

ENERGY SERVICES OR ENERGY-AS-A-SERVICE

Includes services offering the customer access to energy and management services without any associated upfront costs. In the survey, we focus on the demand-side provision of energy services rather than power generation.

HUMANITARIAN ENERGY SECTOR

Energy needs across all humanitarian situations, including both emergency and protracted crises, the needs of refugees and internally displaced people in camps, as well as those in non-camp, urban, and self-settled environments[1].

INTEGRATED SETTLEMENT

A refugee settlement that has been designed to enable refugees and the host community to live side by side, sharing markets, schools, and hospitals[2].

INTERNALLY DISPLACED PEOPLE

Persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalised violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognised state border[3].

REFUGEE CAMP

A temporary facility built to provide immediate protection and assistance to people who have been forced to flee their homes due to war, persecution, or violence[4].

VERTICALLY INTEGRATED COMPANY

A company that controls and manages both the production and distribution of their product or service.

[1] GPA (2022). The State of the Humanitarian Energy Sector: Challenges, Progress, and Issues in 2022. Geneva, Switzerland: UNITAR Publishing. https://www.humanitarianenergy.org/assets/resources/SOHES.pdf

[2] Betts, A., Omata, N. and Sterck, O. (2020). 'The Kalobeyei Settlement: A Self-reliance Model for Refugees?', Journal of Refugee Studies, Volume 33, Issue 1, Pages 189—223, https://doi.org/10.1093/jrs/fez063

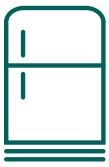
[3] UNHCR. Emergency Handbook. https://emergency.unhcr.org/protection/legal-framework/idp-definition

[4] UNHCR. Refugee Facts: Refugee Camps. https://www.unrefugees.org/refugee-facts/camps/

Most supplied appliances in humanitarian settings

RADIO

TELEVISIONS



REFRIGERATORS/ FREEZERS

Challenges encountered by companies serving the sector

AFFORDABILITY

DISTRIBUTION CHANNELS

CUSTOMER AWARENESS

MARKET INTELLIGENCE

Why should appliance companies serve this sector?

"The opportunity for our technology to create livelihood impact in humanitarian context[s] is disproportionately high compared to rural and peri-urban customers."

MANUFACTURING COMPANY SUPPLYING IN KENYA.

"To align with SDG7, to give affordable energy for all."

VERTICALLY INTEGRATED COMPANY SUPPLYING IN MALI.

Support required to scale up existing efforts

LOCAL PARTNERSHIPS

ACCESS TO FINANCE

Challenges hindering market entry

AFFORDABILITY

DISTRIBUTION CHANNELS

PROCUREMENT PROCESS

MARKET INTELLIGENCE

A young refugee in a nomadic hut, East Africa. Source: Getty Images

1. CONTEXT

Humanitarian settings are often located in regions with poor infrastructure and limited access to electricity. Host governments can be reluctant to invest and build sustainable infrastructure in these areas, as they are seen as temporary solutions. But often, these short-term solutions can turn into a longer-term[5] living situation, resulting in people living in the camps for years or even decades[6].

In such settings, short-term off-grid energy alternatives like diesel generators, which are expensive and environmentally harmful, are often used to supply electricity. UNHCR spends more than **USD 35 million annually**[7] on diesel fuel to provide electricity to refugee camps, predominantly for powering its own operations to provide critical services. **Yet 94% of displaced people in these refugee camps still lack access to electricity**[8]**.** An estimated total of **USD 10 billion**[9] is required to cover all refugee energy needs globally between 2022 and 2030.

In regions lacking reliable conventional grid infrastructure, off-and weak-grid technologies can serve as dependable energy sources. To encourage more appliance companies to operate in this sector, it is vital for these companies, humanitarian organisations, governments, financial institutions, and community groups to collaborate[10]. UNHCR's Human Settlements Group of Friends[11] is such an approach that works towards advancing the living conditions of displaced people and building a resilient humanitarian settlement.

Other inititiatives that mirror this collective approach:

- Practical Action's Renewable Energy for Refugees (RE4R) programme
- SNV's Market Based Energy Access Programmes
- GPA's Transforming Humanitarian Energy Access (THEA)
- Roadmap for Energy Access in Displacement Settings (READS) programmes
- Norway's Humanitarian Innovation Programme
- Enter Energy Ethiopia by Mercy Corps

Despite these initiatives, research around off-and weak-grid electrical appliance companies in the humanitarian energy sector - other than lighting and cooking - is limited. This study aims to address this gap and amplify the voices of the few appliance companies serving the sector. It provides a deeper insight into their experiences, business models, funding sources and challenges.

---

[5] A situation when it is not safe for refugees to return home, nor have they been granted permanent residence in the host country.

[6] UNHCR (2021). Refugee camps explained. https://www.unrefugees.org/news/refugee-camps-explained/

[7] IRENA (2019). Renewables for refugee settlements: Sustainable energy access in humanitarian situations, Abu Dhabi: International Renewable Energy Agency. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Dec/IRENA_Refugee_settlements_2019.pdf

[8] GPA (2022). The State of the Humanitarian Energy Sector: Challenges, Progress, and Issues in 2022. Geneva, Switzerland: UNITAR Publishing. https://www.humanitarianenergy.org/assets/resources/SOHES.pdf

[9] Grafham, O., Lahn, G. and Haselip, J. (2022). 'Scaling sustainable energy services for displaced people and their hosts: How policy and governance make a difference', Chatham House. https://www.chathamhouse.org/2022/10/scaling-sustainable-energy-services-displaced-people-and-their-hosts

[10] Täuber, M., Sandwell, P. and Ndahimana, E. (2023) A Roadmap for Energy Access in Displacement Settings: Uganda. UNITAR. Geneva, Switzerland.

[11] UNHCR (2023). Human Settlements Group of Friends. Available at: https://globalcompactrefugees.org/human-settlements-group-friends (Accessed: 21 November 2023)

2. RESULTS AND ANALYSIS

2.1 COMPANY REACH

The reach of appliance companies in the humanitarian energy sector is currently limited.

Only 57% of the surveyed appliance companies have participated directly in the humanitarian energy sector, indicating that there are still barriers (both perceived and real) preventing appliance companies from becoming involved in this sector.

While the other 43% (nine companies) operate in the wider off- and weak-grid sector, they consider the humanitarian energy sector a difficult market to establish their presence in. Only two of these nine companies considered serving this sector but hesitated to proceed due to these primary concerns:

- complex procurement processes
- limited affordability
- absence of established distribution channels
- inadequate market intelligence

An appliance manufacturer attempting to supply washing machines to a Kenyan refugee camp highlighted another challenge stemming from low consumer demand for specific appliances, stating;

"Hopefully ... washing machines can be used more by the humanitarian sector, particularly refugee camps. Appetite seems very low to non-existent so far"

Laundry washed by hand due to lack of washing machines at a refugee camp. Source: Getty Images

2.2 TYPES OF APPLIANCES SUPPLIED IN THIS SECTOR

Solar appliances[12] play a vital role in addressing the energy needs and improving the quality of life of displaced communities. The most popular among these are smaller appliances like televisions and radios which were distributed in quantities exceeding 100 units — see Figure 1.

The demand for appliances in the humanitarian energy sector is influenced by a combination of factors including affordability, which favours smaller appliances, and specific needs of the community. A vertically integrated company supplying radios, fans, televisions, and solar water pumps in Kakuma refugee camp in Kenya said:

"I think these [radios and televisions] were the most desired appliances after basic lighting and phone charging. Radios' [demand] would be higher than TV's due to affordability (USD 20 vs USD 150+)"

Moreover, radios and televisions play a crucial role in providing information and communication in humanitarian settings. In many African countries, early warnings of droughts, famines, civil unrest, and pandemics are disseminated through television and radio[13]. An empirical study carried out in refugee camps within East Africa, particularly in Ethiopia, Rwanda, and Kenya[14] highlighted that these appliances also allow community members to gather in one place in the evening and allow everyone, including women, to relax after a long day of work.

On the other hand, deployment of larger appliances like refrigerators and freezers is limited due to affordability constraints of the people in the humanitarian settings. Despite approximately 64% of the surveyed companies offering these appliances, the quantity supplied in refugee camps remains notably low, with fewer than 100 units supplied by most companies, except for one. Figure 2 shows one company has supplied more than 1000 units of refrigerators or freezers in the humanitarian energy sector, and at a fully subsidised rate through a UNICEF funded programme for vaccine storage:

"...most of our medical products go to UNICEF who provide cold chain equipment to the world's poorest countries."

Medical specialists assisting displaced people,
Source: Getty images

Similarly, there is limited supply of other larger solar equipment like water pumps and mills in humanitarian settings. In addition to affordability constraints, appliance companies are also concerned about the "low technical training awareness of end users" as reported by the company that supplied solar water pumps in this sector- see Figure 1. End users may not have the necessary technical knowledge or training to operate and maintain complex appliances like solar water pumps or mills properly. This lack of awareness and training can lead to incorrect usage, inefficient operation, and even damage to appliances. A manufacturing company that conducted a pilot study to test the performance of a solar-powered micro-mill in a grain milling business in Kalobeyei integrated settlement said:

"Our solar mill was sold to a micro-enterprise milling maize meal flour [in the settlement]. The unit was damaged beyond repair within two months. A foreign object in the grain damaged the sieves"

[12] E.g. refrigerators, freezers, water pumps, mills, televisions, fans, radios, electric cookers, and e-mobility.

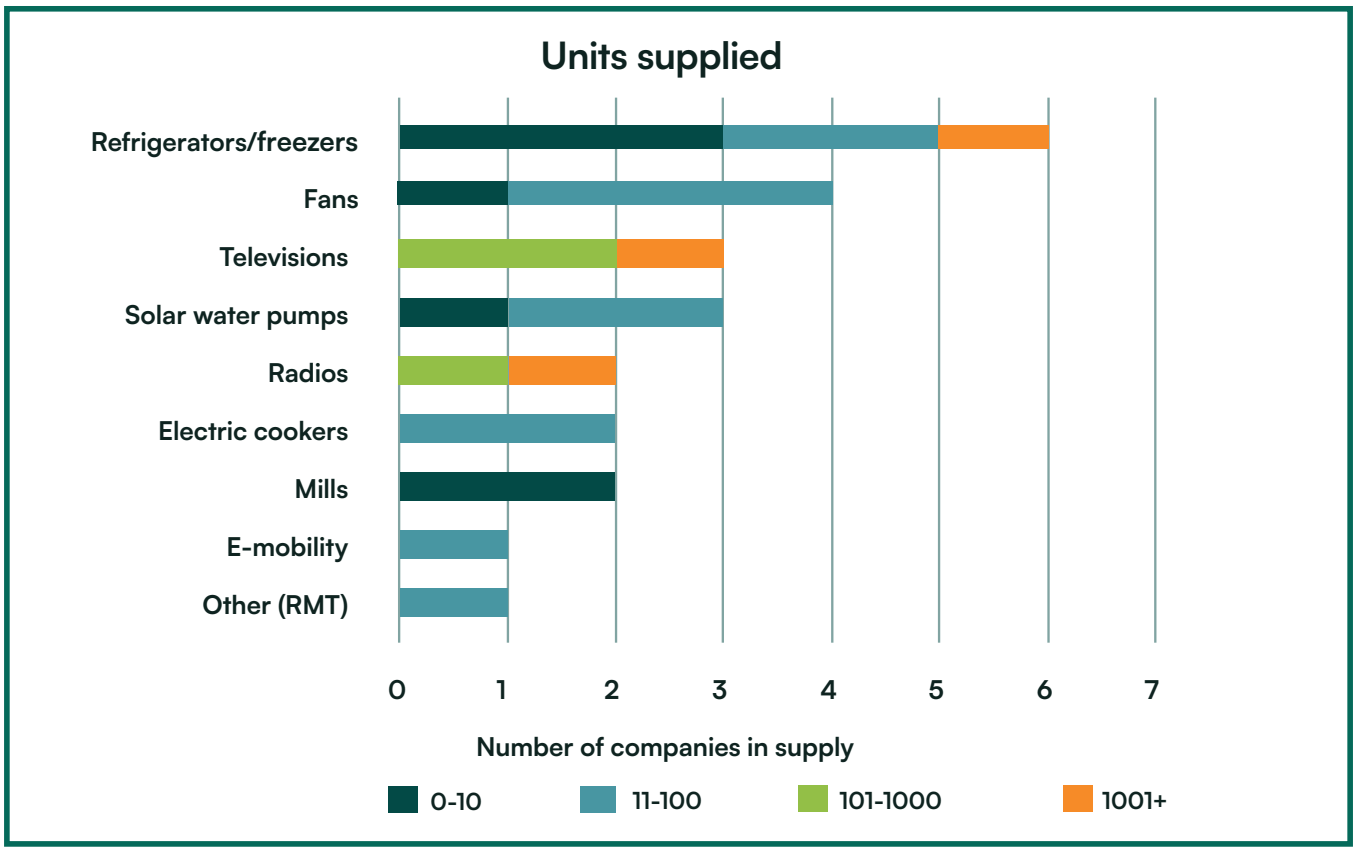
[13] GOGLA (2023). Powering Climate Adaptation and Justice: The Critical Role of Off-Grid Solar Technologies. Available at: https://www.gogla.org/wp-content/uploads/2023/09/GOGLA_Climate-Paper_DEF.pdf

[14] Rosenberg-Jansen, S. (2022). The Secret Life of Energy in Refugee Camps: Invisible Objects, Technologies, and Energy Systems in Humanitarianism. Journal of Refugee Studies, 35(3), pp1270—1291. DOI: https://doi.org/10.1093/jrs/feac026

Fans, electric cookers, e-mobility solutions, and remote monitoring technology (RMT)[15] constitute the rest of the sales reported in the survey. However, fewer than 100 units of each of these appliances have been supplied, suggesting that these appliances may be relatively less common or have limited adoption among the end users of the surveyed appliance companies. In the case of fans, for example, the number of appliance companies supplying fans is high compared to other appliances, however, the units supplied in humanitarian settings remain low, suggesting a discrepancy between the supply capacity of these companies and the demand for the appliance in this sector. An in-depth analysis of the specific requirements and conditions within each humanitarian setting can help align the supply with the actual needs of the people.

A family sitting in front of a fan and a television. Source: Efficiency for Access 2018, Bangladesh/ Pakistan Off-Grid Fans

Figure 1: Number of appliances supplied by survey companies



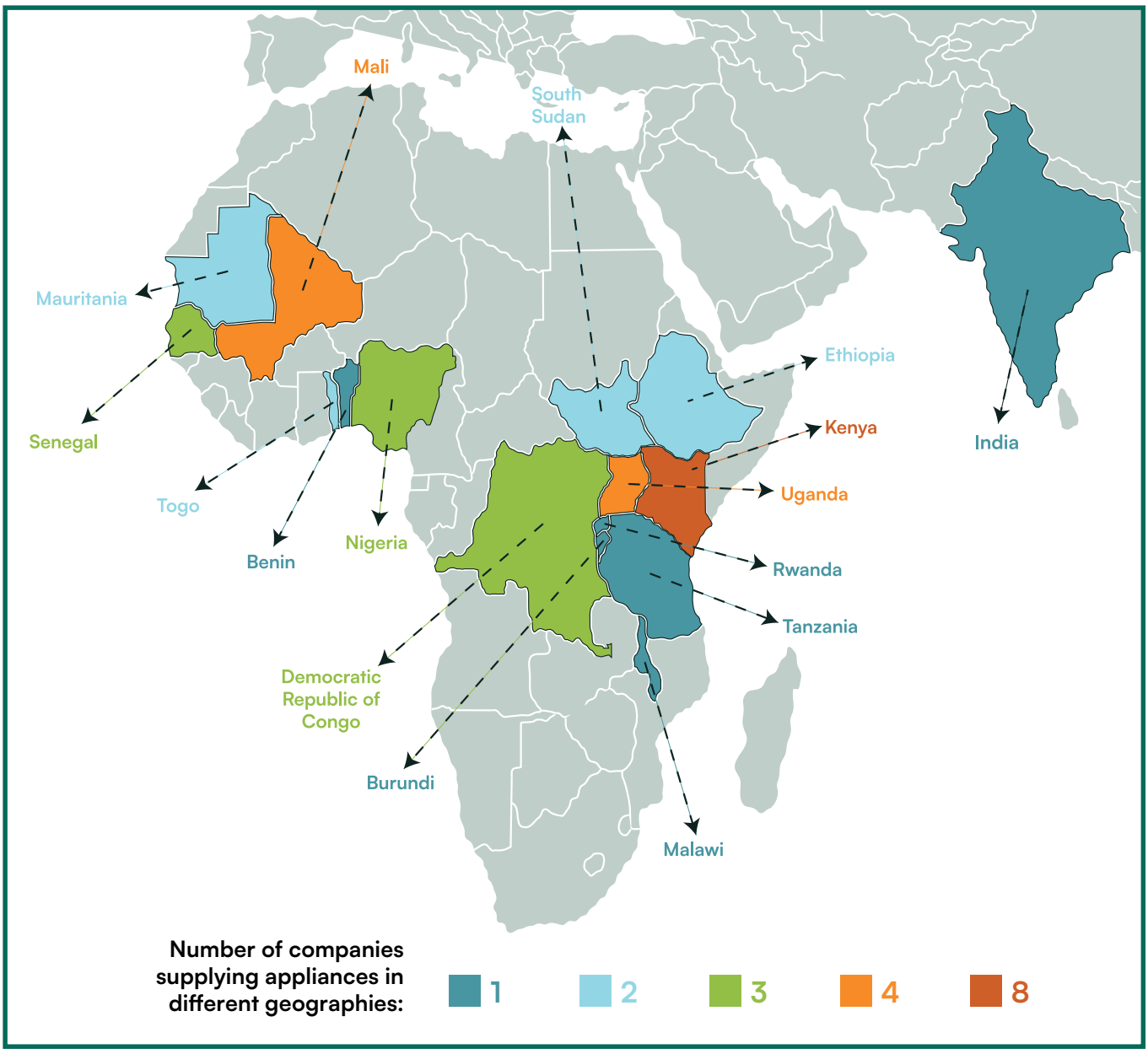
[15] A device used to monitor and improve the performance of electrical appliances.

2.3 AREAS OF OPERATION

Among the surveyed companies, there is a concentrated geographical focus in Kenya, with around 70% of the appliance companies operating in Kakuma refugee camp and Kalobeyei integrated settlement. The full list of regions where these companies have a presence demonstrates a broader reach across several African countries, including Uganda, Mali, the Democratic Republic of Congo, Senegal, Nigeria, Mauritania, Togo, South Sudan, and Ethiopia. A few have also reached India, Malawi, Benin, Burundi, Tanzania, and Rwanda[16].

One respondent with the most widespread portfolio from the surveyed companies reported supplying refrigerators to more than 70 countries through UNICEF-funded programmes. This included (not in the figure below) Ukraine, Fiji, Pakistan, South Africa, Sierra Leone, Cuba, and El Salvador.

Figure 2: Geographies to which surveyed companies have supplied or are supplying appliances



[16] The survey had an unintended geographical bias, primarily influenced by data from African countries. This occurred because the survey distribution was primarily among partners of the Efficiency for Access programme, who predominantly operate in Africa.

2.4 FUNDING SOURCES FOR COMPANIES OPERATING IN THIS SECTOR

A diversified financing approach, combining commercial sales and grant funding, is a common strategy adopted by more than half of the surveyed companies. Grants, whether from bilateral aid agencies, multilateral organisations, national governments, or philanthropic foundations, provide a level of financial security, making it more attractive for private entities to engage in the sector. Grants can cover initial setup costs and facilitate market access, while commercial sales help cover the cost of the appliances.

A manufacturing company relying on multilateral aid to cover the initial overhead costs of operating in Kalobeyei Integrated Settlement in Kenya said:

"…. our marketing, transport/ distribution, training, and installation costs were covered by World Food Programme. Without those costs covered there is no incentive to work in those markets as the cost of customer acquisition is far too high…all costs associated with customer acquisition, training, and after-sales, including local private/ public partnerships, would need to be subsidised".

While World Food Programme[17] covered the overhead costs of the project, the appliances were sold commercially in Kalobeyei:

"One unit was purchased by … aid programme dedicated to promoting small-scale circular agriculture and was used for grinding black soldier fly as an alternative for chicken protein. The other one was distributed through a distributor company in Kalobeyei. World Food Programme provided funding to offset the cost of this experiment. Products needed to be shipped, our staff had to go in, so World Food Programme funds helped with those costs".

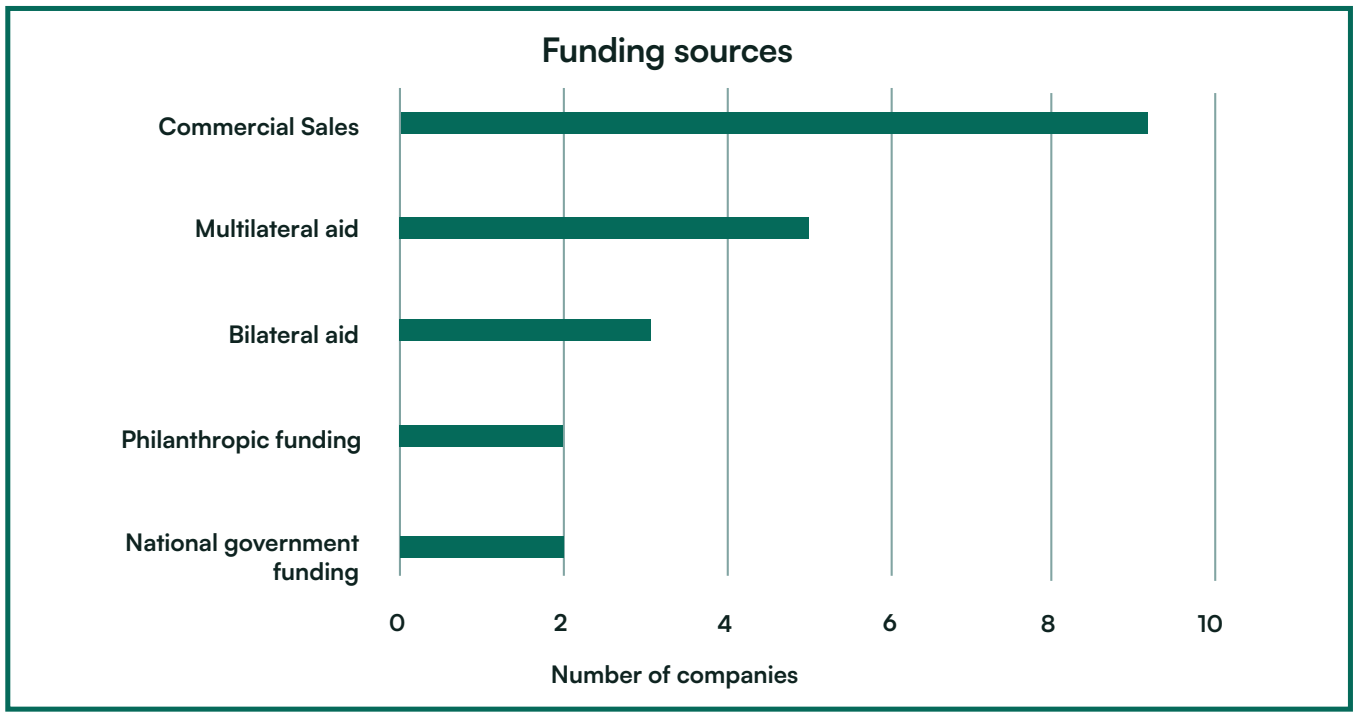
In addition to support from World Food Programme, appliance companies operating in the humanitarian energy sector also received grants from philanthropies like Vodafone Foundation and Response Innovation Lab or multilateral aid agencies like UNHCR, US African Development Fund (USADF), International Fund for Agricultural Development, Energising Development (EnDev) and the World Bank.

Only three appliance companies among those surveyed supply exclusively through commercial sales. These are locally owned companies that distribute their appliances directly to the end users in the humanitarian energy sector on credit or pay-as-you-go (PAYG).

A Saharawi refugee camp, Algeria. Source: Getty Images

[17] An Efficiency for Access Donor Coalition member.

Figure 3: Funding sources of appliance companies (companies could select multiple options)



2.5 BUSINESS MODELS ADOPTED TO SUPPLY APPLIANCES

The most popular business models adopted by surveyed companies are either supplying appliances on credit or through cash-based sales - see Figure 4. Providing credit makes access to appliances more affordable for customers who may not have enough upfront funds to purchase them outright. In many cases, appliances are supplied to another business in the humanitarian energy sector on credit as well. A vertically integrated company from Mali shared their experience of engaging with local businesses:

"We sell [a] solar home system which includes fans, lamps, TV (TVs costs more, so not often), phone chargers directly to businesses in B2B transaction. But due to financial issues, it is hard to work with them. So, we collect data, their national ID and we require a guarantor to give them the debt, so when they show us that they can meet the criteria, then we get into a contract with the business. Every six months we supply Solar Home Systems kits worth USD 20 to USD 100 to the businesses".

There are also cases where the manufacturer sells the appliances to the distributor for cash and the distributor then sells it to the end user on credit. A manufacturer that supplied solar mills to distributors in Kenya shared:

"...one mill was sold to a distributor company in Kalobeyei. They offered the product [to the end user]".

Highlighting the need for a minimum down payment from customers, they further added:

"They supplied the mill to the person on 0% down payment, 100% credit, which is a risky business practice. The end user should pay at least 10% down payment to feel a sense of ownership and commitment to the appliance".

Even a small investment by the end user can signify a level of financial responsibility and ownership, encouraging them to take better care of the appliance and reduce the risk of damage.

Many of the cash-based sales happen between businesses, but in cases where end users directly buy these appliances using upfront cash, it is using the money earned from daily wage jobs, running a small business in or around the camp, or remittances. A Mali based company that directly supply appliances to internally displaced people said:

"People take up small work in the area like daily wage jobs. They also receive money from UN refugee associations. People also get aid from outsiders who give money and other products".

A manufacturing company that has visited and implemented a project in Kalobeyei Integrated Settlement said:

"Remittances trickle into the camp from family members living elsewhere".

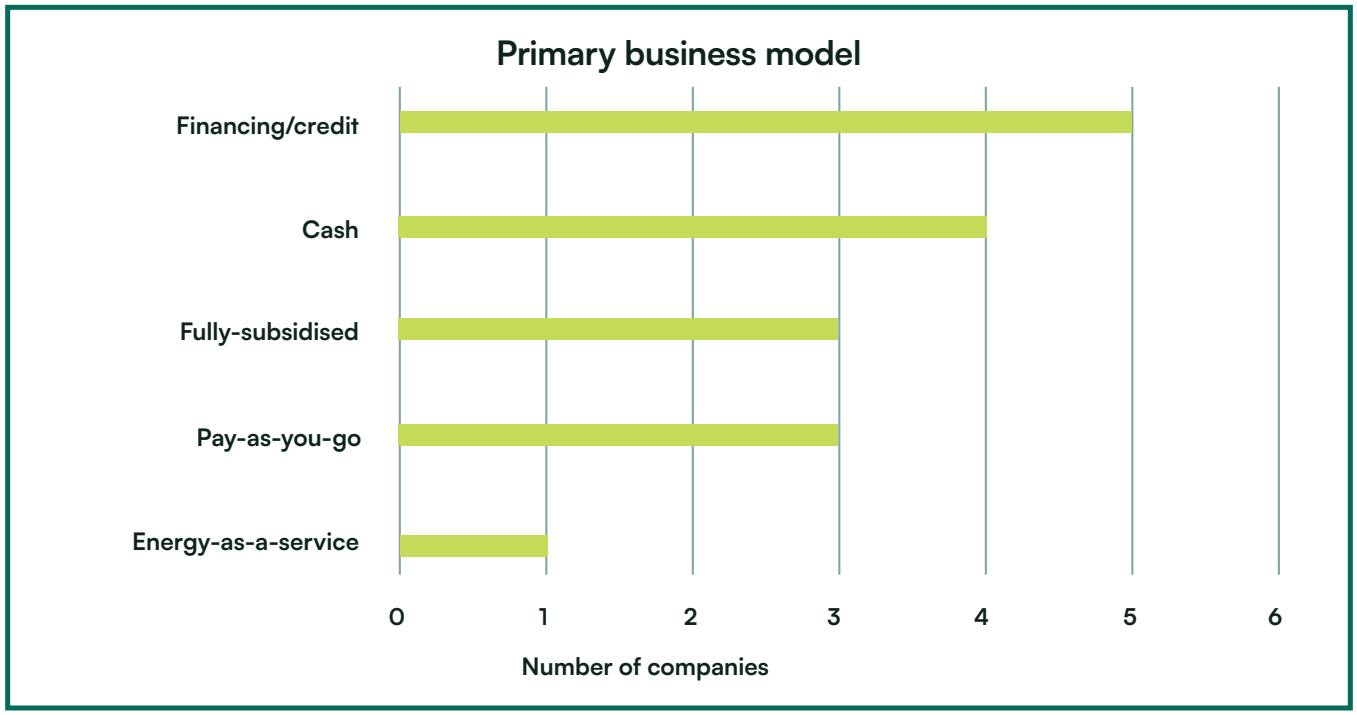
Other business models implemented by the appliance companies included setting up shops in the camps and selling directly to the end users on PAYG or credit. A vertically integrated company supplying radios, fans, televisions, and solar water pumps reported:

"In Kenya, we had set up a shop in Kakuma refugee camp... we had staff directly selling to the area, which included the local population and those living in the camp".

According to our survey, energy-as-a-service is not yet common among the appliance companies — see Figure 4. However, a service provider based in Kenya recently piloted a project to supply fish to Kakuma and Kalobeyei using tricycle mounted solar refrigerators:

"We plan to commercially roll out tricycle mounted solar refrigerators to a youth group. The fridges will help the group earn money by selling fresh fish in Kakuma and Kalobeyei".

Figure 4: Primary business model adopted by appliance companies



2.6 DISTRIBUTION CHANNELS OF COMPANIES OPERATING IN THIS SECTOR

The majority of the surveyed appliance companies (90%) directly distribute the appliances through their own staff, agents, or retailers. A Mali based vertically integrated company reported:

"We have representatives from the Kabala area in the rural sector, who distribute the products in the camps. However, sometimes, we use other people for last mile distribution, they work on a commission, they sell the products for us".

There has also been an instance of a distributor company supplying appliances through aid agencies:

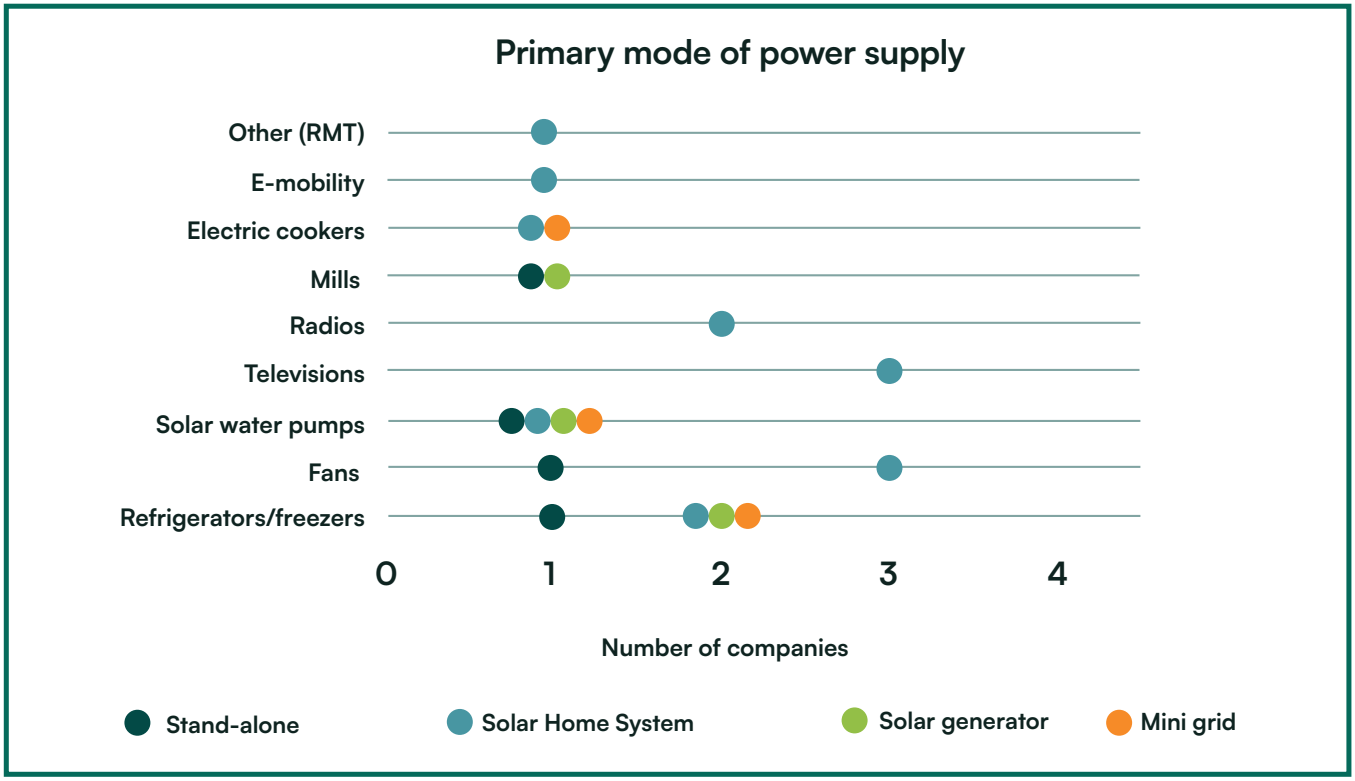
"Units are supplied to a country through UNICEF's in-country teams. We provide installation through local partners or trained Ministry of Health team"

2.7 MODE OF POWER SUPPLY

The most common mode of energy supply in humanitarian settings reported by surveyed companies is solar home systems, especially for smaller appliances like televisions, fans, and radios. Refrigerators/freezers and solar water pumps are powered by all available sources: stand-alone[18], generators, and mini grid[19]. Since mills are often used by microenterprises, stand-alone systems or solar generators are their primary power source.

Due to data limitations, we cannot draw sector-wide conclusions regarding the power supply in the humanitarian energy sector. Further research is required to delve deeper into this specific area and gain a comprehensive understanding.

Figure 5: Mode of power supply



[18] Solar home systems are a cost-effective technology for smaller appliances that requires a smaller infrastructural commitment.

[19] A mini grid is a larger mode of power supply, which can serve a localised group of people connected through a power distribution network.

3. CHALLENGES FACED BY APPLIANCE COMPANIES

Affordability is the biggest challenge for appliance companies to serve the humanitarian energy sector. Larger appliances, such as refrigerators/freezers or solar water pumps, often come with high upfront costs. In many humanitarian settings, access to formal financial services like credit or loans is limited for displaced people, making it even more difficult for customers to pay for these appliances. While PAYG is a promising solution to address the affordability constraints, only three of the 12 surveyed companies currently offer appliances on PAYG.

Another major challenge is the limited access to financing to manage the perceived risk of engaging in the humanitarian energy sector. A service provider based in Uganda reported:

"The ecosystem needs more support from financiers to develop a market for micro-finance institutions/technology suppliers such as providing the incentive to operate remotely and/or guarantees in place. Otherwise, the communities/developers will continue depending on subsidies which is not sustainable".

There is limited grant funding available, and it is difficult for companies to access these funds as they are often underpinned by an extensive application process. Very few among the smaller companies have the resources to invest in a detailed application process, especially given that there is no certainty of securing the funding.

Similarly, a lack of distribution channels and limited local presence/capacity is a major roadblock for many appliance companies, especially for companies that do not have an office or team in or near the humanitarian setting. In addition, there are challenges associated with "poor communication and transport infrastructure". A vertically integrated company supplying appliances in Mali reported:

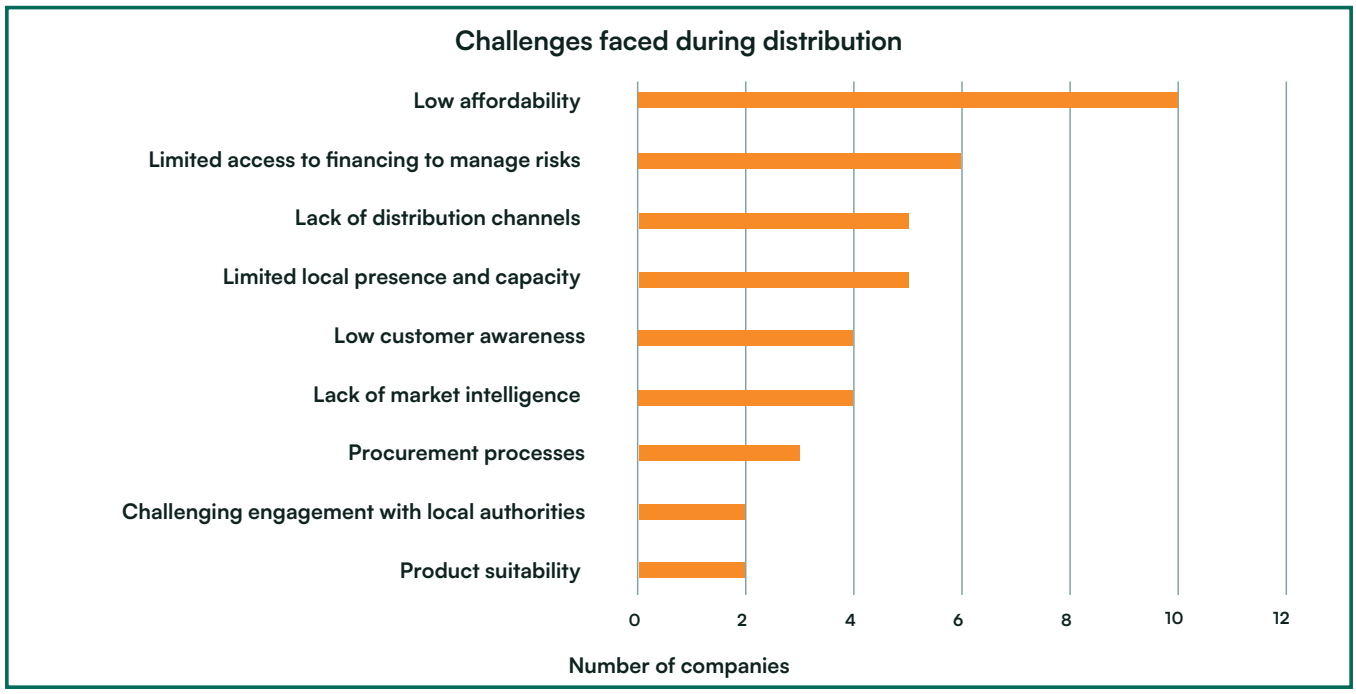
"It is difficult to deploy a team on the refugee side, costs more money to operate. The cost of the project goes up. We have a mobile application, and we send 2-3 staff to the ground to collect the data on people who are interested in the product and our other team understand how they can pay the money back. So, the challenge is traveling to these locations, which is quite remote. Very hard to get last mile distribution".

This suggests that companies might also encounter challenges in establishing after-sales services primarily due to limitations in access. These constraints can significantly impact customer satisfaction rates, as the inability to provide post-purchase support can diminish the overall customer experience. In a recently published report[20], authors recommend establishing local logistics systems through shared storage space or outlets or accessing results-based financing to open outlets in humanitarian settings.

Other challenges include low customer awareness. It should be noted that none of the surveyed appliance companies reported being hindered by prohibitive policies or regulations as a reason for not working in this sector. While it is encouraging that regulatory barriers have not been identified as a significant barrier, it is essential to recognise that the regulatory landscape can vary by region and context. In some cases, although companies may not face explicit prohibitions, the authorisation processes might lack clarity or transparency, complicating operations and demanding excessive time and resources from the company.

[20] Sandwell, P., Täuber, M. and Chuol, N.D. (2023). A Roadmap for Energy Access in Displacement Settings: Kenya. UNITAR. Geneva, Switzerland. https://www.humanitarianenergy.org/assets/resources/READS_Kenya_.pdf

Figure 6: Challenges faced by surveyed appliance companies during distribution in humanitarian energy sector



4. CONCLUSION AND CALL TO ACTION

While there are many challenges associated with a wider deployment of off- and weak-grid appliances in the humanitarian energy sector, our research highlighted that appliance companies are willing to serve the sector. However, they require financial backing and local technical support to effectively work in this challenging environment. From the experience of implementing a pilot project in Kenya, a manufacturing company highlighted the need for more ground support to improve the ease of doing business in humanitarian settings:

"We need the agency of a locally based distributor and some kind of humanitarian organisation to facilitate the arrangement of working in the humanitarian context...we sort of dipped our foot into Kakuma and Kalobeyei and it became obvious that there is a local context, which is difficult for a private sector to seep in... We would need to lean heavily on partners; technical partners and humanitarian partners".

This research was a first step in exploring the scope of operating in the humanitarian energy sector. While there are several challenges to working in this sector, there is also an opportunity to create a meaningful impact on the lives of displaced communities. Calling attention to the importance of serving the humanitarian energy sector, a manufacturing company said:

"...the opportunity for our technology to create livelihood impact in humanitarian context is disproportionately high compared to rural and peri-urban customers".

Similarly, a vertically integrated company, drawing from its experience in supplying appliances to displaced people in Northern and Central Mali, said:

"... it is not only the urban area that should get electricity, but also rural and remote areas need it".

Recognising the opportunities and challenges identified by the surveyed appliance companies, we are designing a new Efficiency for Access research project to build upon the initial findings. The project will aim to diversify livelihood opportunities for displaced and host communities, and derive valuable insights to inform future programmes and policy within the humanitarian energy sector. Through this research we want to inspire Efficiency for Access Coalition members and other sector stakeholders to explore collaborative strategies to enhance access to affordable, high-performing, and inclusive appliances in the displacement contexts. Please get in touch if you would like to be part of this journey.

REFERENCES

Betts, A., Omata, N. and Sterck, O. (2020). 'The Kalobeyei Settlement: A Self-reliance Model for Refugees?', Journal of Refugee Studies, Volume 33, Issue 1, Pages 189—223, https://doi.org/10.1093/jrs/fez063

IRENA (2019). Renewables for refugee settlements: Sustainable energy access in humanitarian situations, Abu Dhabi: International Renewable Energy Agency. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Dec/IRENA_Refugee_settlements_2019.pdf

GOGLA (2023). Powering Climate Adaptation and Justice: The Critical Role of Off-Grid Solar Technologies. Available at: https://www.gogla.org/wp-content/uploads/2023/09/GOGLA_Climate-Paper_DEF.pdf

GPA (2022). The State of the Humanitarian Energy Sector: Challenges, Progress, and Issues in 2022. Geneva, Switzerland: UNITAR Publishing. https://www.humanitarianenergy.org/assets/resources/SOHES.pdf

Grafham, O., Lahn, G. and Haselip, J. (2022). 'Scaling sustainable energy services for displaced people and their hosts: How policy and governance make a difference', Chatham House. https://www.chathamhouse.org/2022/10/scaling-sustainable-energy-services-displaced-people-and-their-hosts

Sandwell, P., Täuber, M. and Chuol, N.D. (2023). A Roadmap for Energy Access in Displacement Settings: Kenya. UNITAR. Geneva, Switzerland. https://www.humanitarianenergy.org/assets/resources/READS_Kenya_.pdf

Rosenberg-Jansen, S. (2022). The Secret Life of Energy in Refugee Camps: Invisible Objects, Technologies, and Energy Systems in Humanitarianism. Journal of Refugee Studies, 35(3), pp1270—1291. DOI: https://doi.org/10.1093/jrs/feac026

Täuber, M., Sandwell, P. and Ndahimana, E. (2023) A Roadmap for Energy Access in Displacement Settings: Uganda. UNITAR. Geneva, Switzerland. https://www.humanitarianenergy.org/assets/resources/Compress_Uganda_READS_report.pdf

UNHCR (2021). Refugee camps explained. https://www.unrefugees.org/news/refugee-camps-explained/

UNHCR (2023). Human Settlements Group of Friends. Available at: https://globalcompactrefugees.org/human-settlements-group-friends (Accessed: 21 November 2023)

UNHCR. Emergency Handbook. https://emergency.unhcr.org/protection/legal-framework/idp-definition

UNHCR. Refugee Facts: Refugee Camps. https://www.unrefugees.org/refugee-facts/camps/

ANNEX I: METHODOLOGY

The data for this study were collected through a short online survey consisting of 15 questions. We distributed the survey directly to 78 stakeholders and advertised it in monthly newsletters of Efficiency for Access, the Global Platform for Action (GPA), Global Distributors Collective (GDC), GOGLA, and the Alliance for Rural Electrification (ARE). The survey was open for one month between March and April 2023.

28 appliance companies responded to the survey. However, we only considered 21 of these companies for further analysis as data relating to five of the companies was lost due to a technical error in the survey platform. Two other respondents did not fit the scope of the study as they were either companies that only provide clean energy cooking solutions or a research institute that does not supply electrical appliances. Quantitative data collected through the survey was complemented by interviews with selected respondents. These follow-up interviews helped to gain deeper insight into how and why certain business models were adopted and what challenges they faced along the way.

ANNEX II: LIMITATIONS

There were certain limitations and lessons learned related to this research project. We lost the data on company name and the respondents' contact details of five companies due to a change in the platform's settings on the retention period of personal data under General Data Protection Regulations (GDPR). Due to this error, we were not able to publish a full list of respondent companies to acknowledge their contributions to the survey.

The survey was disseminated using snowball sampling, a technique where a survey is distributed with an initial group of participants, who then help circulate it further with potential respondents relevant to the study. Due to this form of sampling, most of the companies that participated in this survey were companies that are directly or indirectly part of the Efficiency for Access Coalition. We would thus have to assume that the data is collected predominantly from companies engaged in the off-grid appliance sector, though not necessarily in the entire humanitarian energy sector.

Another limitation is associated with the scope of this study. The focus of the survey was on the supply-side (i.e., engaging with companies to understand their perspectives) since there is very limited data related to the engagement of electrical appliance companies in the humanitarian energy sector. We started with the supply-side perspective due to our existing knowledge and relationships with the private sector that develops off-grid appliances. The next step is to understand the demand-side from an end user perspective. Gathering evidence from end users was not part of this exercise but is key to understanding the whole picture.

ANNEX III: COMPANY ENGAGEMENT SURVEY

Below is a copy of the survey questionnaire presented to appliance companies within the humanitarian energy sector to gather data. This provided insights into the current level of engagement, enabling the development of this report:

PLEASE FILL IN THE DETAILS BELOW:

1. Name of the company:

2. Type of company:

    a. Manufacturer (company that makes goods for sale via B2B (business-to-business) channels)
    b. Distributor (company that buys products from a manufacturer and sells them to other businesses, stores, or customers)
    c. Vertically integrated (combination of a manufacturer and distributor)
    d. Service provider (company providing energy-as-a-service)
    e. Other (please specify)

3. Is your company locally owned?
    *Locally owned is defined as majority local ownership and leadership based on the country/region where the product is used

    a. Yes
    b. No

Q1. Have you supplied any electrical appliances or energy services in the humanitarian energy sector?

a. Yes
b. No

Q 1.2 What type of electrical appliance or energy service have you supplied in the humanitarian energy sector? Please tick all that apply.

a. Radios
b. Fans
c. Televisions
d. Refrigerators/freezers
e. Electric cookers
f. Solar water pumps
g. Mills/grinders
h. Walk-in cold rooms
i. E-mobility
j. Other (please specify)

Please answer the following questions (Q1.2.1, Q1.2.2 and Q1.2.3) for all electrical appliance or energy service you have supplied in the humanitarian energy sector.

Q1.2.1 What were the primary use cases for the electrical appliances or energy services?

a. Household use
b. Income generation
c. Community/Shared use (including health clinics, schools, or offices)

Q 1.2.2 Approximately, how many units have you supplied per electrical appliance type or energy service (total amount to date)

a. 0-10
b. 11-100,
c. 101-1000
d. 1001+.

Q1.2.3 What was the primary mode of power supply to power the electrical appliances or energy services?

a. Stand-alone
b. Solar Home System
c. Diesel generator
d. Solar generator
e. Mini grid
f. Centralised grid
g. Others (please specify)

Q 1.2.4 To which countries/areas did you supply or distribute the electrical appliances or energy services?

Q1.3 How were the supplied electrical appliances or energy services funded?

a. Commercial sales
b. National government funding
c. Bilateral aid
d. Philanthropic funding
e. Multilateral aid
f. Others (please specify)

Q1.4 What was the primary business model used for supplying electrical appliances or energy services in the humanitarian energy sector?

a. Fully-subsidised (provided for free)
b. Cash
c. Financing/credit
d. Pay-as-you-go
e. Energy-as-a-service
f. Other (please specify)

Q 1.5 How did you distribute the electrical appliances or energy services?

a. Direct (distributed by your own staff, agents or retailers)
b. Aid agency (such as UNHCR)
c. National or local government
d. Non-governmental organisations
e. Other (please specify)

Q1.6 What challenges have you faced in distributing electrical appliances or energy services in the humanitarian energy sector?

a. Procurement processes (identifying, winning and managing tenders)
b. Low affordability
c. Limited access to financing to manage the perceived risk of engaging in the humanitarian energy sector.
d. Prohibitive policy and regulation related to the humanitarian energy sector
e. Challenging engagement with local authorities
f. Product suitability
g. Lack of distribution channels for sales and after-sales services
h. Limited local presence and capacity
i. Low customer awareness
j. Lack of market intelligence
k. Other (please specify)

If the company has not sold appliances in the humanitarian energy sector:

Q2. Have you tried or considered this market (humanitarian energy sector) for your products?

a. Yes-tried
b. Yes-considered
c. No

Q 2.1 What barriers have you faced? *(As a follow up question to Q2 if the respondent ticks YES)*

a. Procurement processes (identifying, winning, and managing tenders)
b. Low affordability
c. Prohibitive policy and regulation related to the humanitarian energy sector.
d. Challenging engagement with local authorities
e. Product suitability
f. Lack of distribution channels for sales and after-sales services
g. Low customer awareness
h. Lack of market intelligence
i. None of the above
j. Other (please specify)

Q 2.2 Are you interested in supplying electrical appliances or energy services in the humanitarian energy sector? *(As a follow up question to Q2 if the respondent ticks NO)*

a. Yes
b. No

Q2.2.1 What would be needed for you to consider selling your electrical appliances or energy services in the humanitarian energy sector? *(As a follow up question to Q2.2 if the respondent ticks YES)*

a. Market intelligence
b. Needs assessment.
c. Capacity building
d. Customer awareness campaign
e. Product customisation
f. Business brokerage
g. Finance to address affordability (please specify what type of finance)
h. Other (please specify)

Q 2.2.2 Why are you not interested in supplying electrical appliances or energy services in the humanitarian energy sector? Please tick all that apply. *(As a follow up question to Q2.2 if the respondent ticks NO)*

a. Lack of interest (not aligned with your business strategy)
b. Procurement processes (identifying, winning and managing tenders)
c. Low affordability
d. Prohibitive policy and regulation related to the humanitarian energy sector.
e. Challenging engagement with local authorities
f. Product suitability
g. Lack of distribution channels for sales and after-sales services
h. Low customer awareness
i. Lack of market intelligence
j. Other (please specify)

Q3. Do you have anything else to share?

*We would be particularly interested in any case studies, project examples and data regarding the impact of electrical appliances on end users including income generation, sanitation, health, reduced household burden among women and girls as well as inclusivity data related to gender, disabled people, youth and other.

**Open ended box where people can write their inputs or share links. Add an option to upload documents.*

End.