

**ENERGY
CATALYST**

Market Guide: Humanitarian

June 2020



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According to UNHCR, the number of forcibly displaced people both within countries and across borders as a result of persecution, conflict, or generalized violence has grown over 50% in the last 10 years; there were 43.3 million forcibly displaced people in 2009, and 70.8 million by the end of 2018. Today one in every 108 people in the world is displaced.

Nearly 25.9 million of the 70.8 million are refugees, over half of whom are under the age of 18. Also, 80% of refugees live in countries neighbouring their countries of origin. Refugees and displaced people often have minimal access to modern energy and are neglected by national energy access agendas. In addition, the communities that host displaced people often lack reliable energy sources.



Humanitarian operators spend large amounts of money on polluting diesel fuel (\$1.2 billion was spent on polluting fuel in 2017). UNHCR and partners don't have the expertise or resources to comprehensively provide power to displaced people and are looking to the private sector to provide solutions and expertise.

Sub-Saharan Africa, for example, hosts more than 26% of the global refugee population (6.7 million). More than 24 million displaced people across Sub-Saharan Africa are of concern to UNHCR with more than 6 million refugees and more than 17.7 million internally displaced people (IDPs). People mostly fled from the Central African Republic (CAR), Democratic Republic of Congo (DRC), Somalia, and South Sudan. In Myanmar, more than 700,000 Rohingya refugees fled violence in Rakhine state to Bangladesh in 2017. The needs of Rohingyas in Bangladesh and Myanmar are likely to remain immense in 2020.

The focus of this guide will be on SDSN (2016)'s SDG 7, which aims to ensure access to affordable, reliable, sustainable and modern energy for all. This will ensure that when it comes to energy access, displaced people are not left behind.

Sector trends

Access to safe and sustainable energy is a basic human need. Without it, the forcibly displaced – particularly women and children – may be at increased risk and have less time to rebuild their lives. UNHCR is committed to addressing the energy needs of refugees and host communities, while seeking to reduce our own environmental footprint.

Access to cooking energy is essential for refugees, as 95% of food supplied in refugee camps is raw and has to be cooked. Displaced people are spending significant amounts of their income on cooking – on average \$5/month in Kakuma, for example, and \$7/month in Goudoubou. 84% of displaced people are cooking with biomass in camps. Humanitarian agencies may supply free fuel (normally firewood) but it only meets a fraction of people's needs.

Some governments (e.g. Rwanda) are banning firewood use in refugee camps, due to high environmental degradation, and limited alternative fuels exist. Such government policies further affect the supply of biomass for cooking.

The Moving Energy Initiative (MEI) – a partnership between Energy 4 Impact, Chatham House, Practical Action, the Norwegian Refugee Council and the UNHCR – is promoting pioneering approaches that involve private sector players, as well as market-oriented solutions, in order to alleviate this challenge while improving the livelihoods of refugees and host communities. Some of its initiatives in Kenya, Burkina Faso and Jordan aim to address these challenges by incorporating the private sector in the implementation of low carbon projects and by aiding the reduction of fossil fuel use, while establishing local market-based solutions for energy access and creating energy markets and livelihood opportunities.

IRENA is supporting UNHCR in tackling the unavailability of reliable energy data, and analysing technically and financially sound renewable energy options that UNHCR can implement in selected field locations. In collaboration with IRENA, UNHCR has also identified action areas in its new Global Strategy for Sustainable Energy 2019-2024, which include:

- increasing sustainable electrification of community and support facilities, while limiting overall energy consumption
- improving access to sustainable, safe and affordable household cooking energy
- addressing the energy needs of refugee households from the onset of an emergency
- increasing sustainable household electrification

Solutions to consider for clean energy supply

Various energy solutions have been applied successfully in providing clean energy for refugee settlements in Iraq and Ethiopia. These include solar lighting kits, solar home systems, mini grids with solar PV and battery storage, the grid plus renewable energy and solar water pumping solutions.

Solutions to consider for clean cooking

At least 84% of displaced people use biomass for cooking in camps, which has a negative impact on their health and the environment due to the polluting smoke emitted. Some of the clean modern bioenergy solutions considered for providing refugees with clean cooking are ethanol and biomass briquettes. Another option that could be considered is biogas produced from the refugees' wastewater.

Sector challenges

The following are some of the energy access challenges faced in the humanitarian setup:

- Distortion of the market due to giveaways and high levels of donor funding
- Access to displacement settings and to decision makers in the humanitarian sector
- Restrictions on refugees' rights to work, access finance and move freely, which limit their economic potential
- Ensuring the principle of 'do no harm' in operations
- Risks and costs associated with operating in remote locations and fragile states with poor security
- Uncertainty around how long displaced people and refugee camps will be in place
- Rapid response needed in emergency settings
- Lack of disposable income of refugees and issues relating to trust and high likelihood of theft
- Short term funding and institutional barriers encourage short term solutions

Sector opportunities

Despite the challenges faced in the humanitarian setup, there are opportunities for companies planning to establish themselves in this market. Examples are:

- Refugee camps can offer economies of scale, particularly when considered with the wider economies of the region
- Switching to renewable energy sources can produce significant cost savings for the humanitarian sector
- Humanitarian organisations may be willing to partner with the private sector to support on the ground operations
- Additional sources of donor funding may be available to de-risk investment and cover additional costs
- Cash based programming could be considered to boost refugee's ability to pay
- Momentum for this issue is building with new initiatives and donors coming on board

Active players in the sector

Table 1 Active players in the sector

NGOs/Foundation	Funding/Global Agencies	Other
<ul style="list-style-type: none"> • United Nations High Commissioner for Refugees (UNHCR) • International organization for Migration (IOM) • Islamic Relief Worldwide (IRW) • International Rescue Committee (IRC) • International Committee of the Red Cross (ICRC) • International Federation of Red Cross and Red Crescent Societies (IFRC) • Norwegian Refugee Council • UNICEF • Refugees International • ORAM Refugee • HIAS 	<ul style="list-style-type: none"> • Department for International Development (DFID) • Japan International Cooperation Agency (JICA) • Norwegian Agency for Development Cooperation • USAID • European Union 	<ul style="list-style-type: none"> • International Displacement Monitoring Centre (IDMC) • Global Plan of Action

Case studies

Case study 1: Tsore Refugee Settlement in Ethiopia

Context: The lack of grid connection keeps refugees in the dark and forces humanitarian organisations to use diesel generators to power health clinics, offices and boreholes.

The Tsore refugee settlement is located 20 kilometres north of Assosa on the Ethiopian border with Sudan. The settlement was established in 2015 to accommodate Sudanese and South Sudanese refugees seeking protection. The settlement hosts 14 153 refugees and is the second most populated refugee settlement in the Assosa region. While the Tsore settlement is located 200 metres from a main power transmission line in the region, it has not been connected to the national grid. This has significant implications for refugees and humanitarian organisations operating in the settlement.

The humanitarian organisations rely on diesel generators to power offices and guesthouses as well as service delivery points such as health clinics, boreholes, training centres and livelihood programmes. Technical visits to the various locations showed that the humanitarian organisations consistently ran generators that were greatly oversized compared to the load that they were servicing. For several of the bigger offices, most organisations operated generators that are designed to power loads 10 times larger than the ones they were connected to. This leads to poor energy efficiency and to accelerated depreciation of the generators due to increased maintenance requirements and wear. Furthermore, many of the humanitarian organisations were running the diesel generators simultaneously in compounds in close vicinity to each other, where one generator could have serviced multiple offices.

To improve the energy situation in the Tsore refugee settlement, several activities are recommended to be carried out in parallel:

1. Establish a mini grid in the settlement. This could increase the efficiency of the diesel generators by an estimated 50% and greatly reduce maintenance costs, by avoiding running multiple diesel generators at very low load and instead optimising the dispatch of the fleet of existing generators to serve the combined load. UNHCR or ARRA could take the lead in establishing the mini grid and collect payments from organisations that are connected to the grid by metering each connection point. The use of solar power could further reduce long-term costs and is best implemented through a mini grid set-up rather than separate standalone systems. A 60 kW solar plant with a 150 kWh battery bank would decrease diesel consumption in the Tsore settlement by an estimated 60%, or around 2 500 litres of diesel per month. The mini grid could eventually be expanded to provide the refugees with access to electricity. Delivery models such as leasing or PPAs could be employed to reduce the technical and financial risk linked to deploying a solar-based mini grid.

2. Initiate market-based solar lamp access initiatives in the settlement to provide refugees with access to improved lighting as well as charge points for small appliances such as phones and radios. This must be done in a way that is sensitive to the existing ecosystem for solar lanterns in the settlement, to avoid the disruption of existing markets. Any lanterns provided should be approved via an international quality mechanism (for example, IFC's Lighting Global).

3. Basing on a detailed, protection-sensitive lighting needs assessment, increase the use of solar streetlights to improve the lighting situation in the settlement. The installation of the lights can initially be concentrated around key points in the settlement, such as health clinics, schools or main roads, and should eventually also be installed in the main residential zones. Responsibilities for maintenance of the lights must be clearly defined to ensure their continuous operation.

4. Apply for a grid connection for the settlement from Ethiopian Electric Power. ELPA in Assosa explained that it would positively support extension of the grid from the transmission line to the settlement. ELPA explained that this has been discussed previously, but that ARRA had been uncertain of the size of the demand in the settlement. The data collected can assist ARRA in estimating current and future demand. A national grid connection would also allow for the possible sale of excess electricity from the solar mini grid to ELPA. However, this must be discussed prior to the request for connection.

Case study 2: Domiz 1 and 2 Refugee Settlements in Iraq

Context: The government is assisting refugees with free power but is unable to maintain sufficient electricity supply, and refugees must turn to expensive neighbourhood diesel generators to keep lights on.

The settlements share much of the infrastructure with the Duhok urban area, and many refugees commute to the city daily. With the establishment of the refugee settlements in Domiz, the Department of Electricity determined that they should be provided with connection to the national grid without having to pay for the electricity. The host community in Duhok is connected to the national grid with a meter and pays for the electricity on a kWh basis (around USD 0.11 per kWh).

The main power source in the Duhok region is a natural gas-fired power plant, and the electricity produced comes at a marginal cost, where each kWh produced requires extra natural gas as input. This means that the local government in KRI must cover the cost of the electricity that is delivered to the refugees in the settlement. The Department of Electricity stated that it was not in an economic position to provide the refugees with continuous power and reported that the national grid was operational in the settlement for 12 hours per day during the summer and winter, and 20 hours per day for the rest of the year.

To compensate for the cut in service from the national grid, several private actors have established local neighbourhood grids powered by diesel generators. These grids operate during periods when the national grid is not working. The settlement co-ordinator explained that the diesel grid operators received permission from the local government to operate in the settlement, but that the overall regulation for how to operate was not clearly defined. This meant that the diesel grid operators could determine the price of electricity and set the number of hours they would operate the local grids.

While the refugees in the Domiz settlements were provided with a 6-ampere breaker to the national grid, they were provided with a 3-ampere connection to the neighbourhood diesel grid. This meant that the number of appliances they could operate was greatly limited and that using washing machines, water boilers, and electric cook stoves and heaters was not possible. Furthermore, the respondents in the household survey reported that they spent an average of IQD 26,000 per month (around USD \$22 per month) for an estimated 25 kWh per month of average electricity consumption from the diesel systems. This would translate to an electricity price of USD \$0.88 per kWh, much higher than the price in most countries.

To improve the energy situation in the Domiz refugee settlements, several parallel activities are recommended:

1. Install renewable power plants on the feeder lines to the settlements to compensate for the lack of electricity supply. These renewable power plants could be sized to provide excess power that could be fed into the national grid to the benefit of the host community. With the installation of a grid-tied 6.5 MW solar PV power plant in Domiz 1 and a grid-tied 2.5 MW solar PV power plant in Domiz 2, the overall electricity requirements of the settlements would be covered during the peak hours of the summer months when the use of air conditioners is highest. Energy storage could be added to increase the power

quality and the number of hours covered by the solar system, although this would greatly increase the cost of the installation.

2. Facilitate any investments in infrastructure for the refugee settlement to take place in ways that reduces UNHCR's technical and financial risk. For example, with the use of a power purchase agreement, UNHCR can specify the amount of electricity to be delivered without being required to provide the technical specification of the plant or the investment required to cover the installation.

3. Push for meters to be installed at households in the Domiz settlements and for refugees to pay for the electricity similarly to the host community, on a kWh basis. The average household with monthly energy consumption of 330 kWh would pay on average IQD 43 500 (USD \$36) per month for the electricity, compared to the IQD 26 000 (USD \$21) that they pay per month on average for the three-hour connection to the neighbourhood diesel generators. The increase in price would be because the refugees would pay for all the electricity they receive, similarly to the host community, not just for the electricity from the diesel generators. A household income sensitivity analysis should be done prior to the shift to determine the refugees' need for additional support to pay the increased costs. An alternative option could be to design a tariff below the current cost of connecting to the diesel, effectively reducing the cost for both the local government (which presently provides free electricity) and the refugees, and still providing a reasonable return on investment on the solar system. This would also enable competition in the supply of electricity, creating a framework where overpriced diesel supply would compete with affordable and clean supply from solar PV. In the shelter and settlement strategy 2018-2021 for KRI, the installation of household electricity meters has been planned to facilitate the future integration of the Domiz settlements into the host community.

References and further reading

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The Costs of Fuelling Humanitarian Aid

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Prices, Products and Priorities: Meeting Refugees' Energy Needs in Burkina Faso and Kenya

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The Energy Situation in the Dadaab Refugee Camps, Kenya

<https://www.chathamhouse.org/sites/files/chathamhouse/publications/research/2016-05-19-mei-energy-situation-dadaab-refugee-camps-okello-final.pdf>

Global Plan of Action for Sustainable Energy Solutions in Situations of Displacement

<https://unitar.org/sustainable-development-goals/peace/our-portfolio/global-plan-action-gpa-sustainable-energy-solutions-situations-displacement>

Useful contacts

United Nations High Commissioner for Refugees

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