

Access to more: creating energy choices for refugees

A report about collaborative approaches to providing energy in displacement.



About

Shell International

Energy has been Shell's business for over 125 years. Over the decades, the Shell group of companies has provided reliable supplies of oil, natural gas and refined fuels around the world, helping to drive economic development. Today, Shell views its contribution to universal access to energy as fundamental to its core purpose: to provide more and cleaner energy. Globally, around 860 million people still lack access to electricity and hundreds of millions more have an unreliable supply. We want to help people gain access to the benefits of electricity and – in line with society's expectations – from cleaner sources. That's why, in 2018, Shell announced its commercial ambition to deliver a reliable electricity supply to 100 million people, primarily in Africa and Asia, by 2030.

Complementary to this and in order to help address one of the world's most pressing societal issues, Shell in 2019 announced the social investment "Enter Energy" project to support energy access for refugees and displaced people and their host communities. In close collaboration with partners from the humanitarian and private sector, Shell will work to equip displaced people & host communities, energy enterprises and humanitarian actors with the relevant data, skills and financial mechanisms to build local energy markets.



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Foreword:

Why we need to share, be determined and collaborate to jointly achieve more



Maarten Wetselaar, Executive Committee Member Royal Dutch Shell – Integrated Gas and New Energies Director

I had my first experience with a refugee camp in the early nineties when I visited my wife (at the time still my girlfriend) who was working in Ghana on food supply to camps that housed refugees from Togo.

I will never forget the hunger and desperation in that camp. I saw that the life of a refugee is a life with many of its choices taken away. A refugee cannot choose how to live, earn a living, or plan for the future. A refugee often does not even have a choice over whether they can light their homes or cook their food, because they just don't have access to the energy they need.

But in that camp, I also saw great ingenuity, willpower and humanity. I saw people who wanted to improve their lives. Refugees, but also all other displaced people (those forced to leave their homes but who did not cross a border in their search for safety) and the communities who host them, could significantly improve their lives if they had access to the reliable, clean and affordable energy they want and

need. Governments and humanitarian organisations are having difficulty providing this energy, because the number of displaced people across the world is growing, crises are taking longer to solve and the energy needs of people in camps and settlements are becoming more diverse. This is why governments and the humanitarian sector are increasingly asking businesses to help develop energy markets and give people in and around settlements the possibility to choose the (renewable) energy they want and need.

This report, a collaboration by Dalberg, Vivid Economics and Shell, looks at how these energy markets work now, and how they could work better in the future. Shell has some experience of providing energy to the underserved. We have been helping to build local energy markets for remote communities through our social investment projects for the last 15 years. And in 2018, we launched the ambition to provide reliable energy to 100 million people who currently don't have access to it by 2030. This is no simple task – and providing for displaced people is even harder. This report gives some guidance on how to start: by all those involved sharing our knowledge, showing our determination to succeed and strengthening our collaboration.



First, humanitarian organisations, governments and the private sector should share knowledge. The International Finance Corporation and the Moving Energy Initiative, led by Chatham House in the UK, for example, have published groundbreaking studies that have shown that where there are people, there is trade. To give just one example, Kenya's Kakuma camp has an estimated 2,000 businesses across various markets within the camp and in its peripheral host community, where people spend some \$56 million a year. So, there is trade in camps, some of which become long-term homes for many people. But we still need to better understand how to support this basic supply and demand.

This report doesn't have all the answers, but hopes to contribute to advancing the knowledge on these economies and add new insights. For example, displaced people around the world already spend more than \$1.6 billion a year to light their homes and cook their food. So, energy markets, even if often informal, already exist. Also,

interviews with people in the Bidi Bidi camp in Uganda that were done for this research show that displaced people who were already accustomed to renewable energy in their country of origin, are much more willing to spend a bigger part of their budget on cleaner energy than those who have not had that exposure. This report also shows the social impact that improved access to energy among displaced people can have: every dollar spent on better energy access generates between \$1.40 and \$1.70 in the form of employment, environmental benefits, productivity and time savings.

Providing energy choices for displaced people is far too complex a challenge for one country, community or company to solve. This is why the second step we need to take is to strengthen our collaboration. Even this report would not have been possible without the help of Acumen, the Global Plan of Action for Energy in Displacement, GOGLA, The World Bank Group's Lighting Global, Mercy Corps, the Smart Communities Coalition, Sustainable

Providing energy choices for displaced people is far too complex a challenge for one country, community or company to solve.

Energy for All, and the guidance of UNHCR and IOM. Humanitarian and development institutions, NGOs, governments, communities that host camps and settlements and companies that provide local energy access – we all need to work together to remove the obstacles that stand between displaced people and energy choices.

That brings me to the third step we should take. We should adopt a mentality of long-term determination. This report confirms that the complexities of the humanitarian system and the instability of a displaced person's life make it difficult for companies to invest. For entrepreneurs, who hold the key to the solution, investment is a long-term decision fraught with risk. So, we need to find ways to mitigate these risks and enable investments to flow.

Thirty years after my first experience with a refugee camp, the world still needs to take many steps to improve the lives of refugees and displaced people. I hope that this report can be one of those steps and can start a dialogue about how the private sector can help and play its role. Giving displaced people energy choices is an opportunity for so many people on so many levels. By sharing our knowledge, showing our determination and strengthening our collaboration, we can seize it, for the benefit of those who deserve it most.

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About this report

Objectives and scope

This report aims to highlight and quantify the need and opportunity for private energy companies to help provide access to reliable, affordable and clean energy in and around camps and settlements for refugees, other displaced people, host communities, and the aid and development agencies that serve them. The insights in this report aim to:

- A** Build evidence in support of involving the private sector to provide this energy.
- B** Offer data and analyses to better understand energy demand and supply in and around camps.
- C** Show opportunities for collaboration for the private sector, aid and development organizations, and host governments.

The report offers a global perspective across displaced persons, host communities, and aid and development agencies in refugee camps and settlements. The analysis covers current (based on 2018 data) and projected (2030) energy demand for both power and cooking.

¹ The models provide an estimate based on specific scenarios of broad macro-economic trends. It does not intend to predict outcomes at the individual camp level. Broad assumptions have been used to provide a useful understanding of the size of the opportunity and a way to think about the how opportunities may develop in the coming years.

Methodology

This study adopted a four-pronged research approach.¹

1. **Secondary Research and Data Analysis:** Collation of and building on secondary sources to investigate the current state of the market, including market research studies, household surveys, scientific literature on technology research and development, as well as country-level databases to ascertain electrification level, income and expenditure patterns.
2. **Development of Two Proprietary Models:**
 - a. **Market sizing:** Proprietary model estimating the total potential market size for energy products in displacement settings based on projected incomes and energy spend.
 - b. **Impact assessment:** Proprietary model quantifying the economic, social, and environmental impact of private sector engagement in energy in displacement.
3. **Primary Research:** In-depth, semi-structured interviews with over 50 stakeholders such as off-grid energy enterprises, investors, technical experts, humanitarian agencies, NGOs, research institutions and thinktanks.
4. **Survey:** In-person household survey of around 371 displaced households, some 201 host community households and 50 businesses operating within the Bidi Bidi settlement in Uganda. This survey provides insights into the individual displaced person's incomes, current expenditures on energy, attitudes toward energy usage and willingness to pay for energy products. Note: The survey allows this report to provide a fresh perspective, based on new data, on the topic. Results from the survey inform the analysis and recommendations in this report. Acknowledging that primary research represents one country (limited by the implications of the COVID-19 pandemic), we have nuanced the survey results with data from secondary data sources, where available, and interviews. Results in this report, including the outputs from the models, should be viewed through this lens and compared with other research.

Executive summary

Access to more: creating energy choices for refugees

A report as part of Shell's Enter Energy initiative enabling access to energy for displaced people and their host communities.

In 2019, almost 79.5 million people worldwide were forcibly displaced from their homes.² This community of people is often referred to as displaced people, a term that covers refugees, who crossed a border in search for safety, and those forced out of their homes, who remain in their country or origin. Some of these people are settled in camps, others dwell in urban settlements or have a new home. Humanitarian agencies keep camps and settlements safe and provide them with basic provisions like food and shelter. However, this task is becoming increasingly difficult for three reasons. Firstly, the number of refugees and other displaced people has been growing at a rate of 11.7% per year from 2013-2018. Secondly, the causes for displacement are becoming more complex. Historically, people fled their homes because of persecution, conflict, violence, human rights violations or natural disasters. Today, it is often a combination, making it more difficult for people to determine when it would be safe to return home. Thirdly, these complex crises also last longer, which forces people away from home for a much longer time than in the past. As of 2018, around 16 million people had been living in camps and settlements for five or more consecutive years.

A large proportion of these people do not have access to reliable sources of energy today. Most displaced households use candles,

battery powered torches or kerosene lamps for lighting, meaning that 80% of them have little (less than 4 hours per day) or no access to electricity. Similarly, 80%³ of these households use collected firewood or charcoal to cook their food.⁴ Even facilities run by humanitarian agencies like office compounds, schools and health clinics often do not have reliable electricity. As one health officer said: "If a patient has to use an incubator in the morning, we usually have no lighting available that night."

Improved access to energy creates positive long-term effects that can significantly outweigh the spend on energy itself. Every potential dollar spent on greater energy access represents a value of \$1.40 to \$1.70 from employment, improved health, productivity, time saving and, through replacing diesel generators with solar energy, environmental benefits.

If we proceed with business as usual, the unserved need for energy in and around these camps and settlements is expected to grow. The COVID-19 pandemic is expected to have severe effects on households⁵, businesses, and institutions⁶ in the refugee and the host communities. In the long term, however, their energy demand is still expected to grow. For example, the current estimated spend on cooking and power in these settings is around \$1.6 billion. By 2030, this may reach \$3.9 to

² UNHCR Global Trends, 2019

³ As per the SEforALL Multi-tier Framework for measuring energy access, based on the impacts model

⁴ MEI, "Heat, Light and Power for Refugees", 2015

⁵ Includes displaced persons as well as host community households living in a 10-km radius of camps and settlements

⁶ Institutions refers to humanitarian/development agencies, government bodies and NGOs working to support displaced persons

\$5.3 billion. It is a great challenge for the humanitarian sector to meet this future demand. In fact, the humanitarian sector cannot even meet today's demands. The United Nations High Commissioner for Refugees' (UNHCR) funding gap increased from \$2.1 billion in 2013 to \$3.5 billion in 2018.⁷ This gap, combined with the problems posed by annual budget cycles, make it difficult for the humanitarian sector to plan for the long-term and make investments that could help meet the energy needs in displacement in a sustainable way.

Consequently, the humanitarian sector is changing its approach to energy supply. To start, there is a movement towards cleaner and more cost-effective energy sources.

The UNHCR's Clean Energy Challenge from 2019, for example, aims to ensure that all refugee settlements and nearby host communities can access affordable, reliable, sustainable and modern energy by 2030. Also, there is a shift towards planning for the longer term. And perhaps most significantly, there is an increased tendency to give people in camps and settlements a budget, that allows them to choose the energy sources they prefer instead of handing out energy products that they might not need. The UNHCR's Comprehensive Refugee Response Framework (CRRF) from 2016, for example, aims to help refugees become more self-reliant and gives them the opportunity for social and economic development, so they can earn their own living and buy the energy of their choice.

This new approach will only be successful in partnership with the private sector. Giving displaced persons energy choices requires private companies to invest in energy markets offering a wide variety of products and services. This will allow families to buy

the energy source that is most relevant to them. Also, as populations live longer in camps and settlements, their needs and behaviours become more similar to those of the average off-grid energy consumer. This means energy companies can apply what they have learned from the off-grid market, like focusing on affordable, small and portable energy products, to displacement settings. The private sector can also provide scale. While initial demand-side subsidies are likely to be required, engaging the private sector can help energy supply become self-sustainable such that it is no longer vulnerable to the annual budget constraints of the humanitarian sector. This vulnerability is becoming even more acute as a result of the COVID-19 pandemic. As funds are diverted to responding to the consequences of the virus, the need for self-sustaining approaches is growing.

Apart from offering energy choices to displaced people, private companies can also help humanitarian agencies to run their operations more sustainably and host communities to benefit from energy access. People in camps and settlements represent around 20% of energy demand in displacement settings. The remaining 80% are split between powering offices and public utilities such as water pumps, hospitals, and schools that are run by humanitarian agencies (around 20% of total energy demand) and the members of the host communities who live and work just outside the camps (around 60%). These communities can and want to pay for better energy but are largely unserved due to their remote location. This shows that considering refugee and host community energy provision jointly not only makes it more attractive for private companies to get engaged. But also, it ensures that the

⁷ UNHCR, "Financial reporting", 2013-18

positive impacts of energy access can be shared, which will support host and refugee integration. It is therefore not just an option to address both host and displaced communities' energy needs – it is a must if we are to sustainably transform energy provision in displacement settings.

But before the private sector can help, obstacles for investment need to be removed. For companies, investment is a long-term decision that should include as little risk as possible. Today, these risks are either too high or simply unknown. There is, to name but a few examples, not enough data about energy use in and around refugee camps and settlements, making it hard for companies to assess precisely what kind of energy displaced people want and need. Also, the remote locations of many camps can cause transportation issues, communication challenges and high logistical costs. Finally, difficulties with acquiring and holding on to local staff can make it hard to provide the right energy for the right people.

The humanitarian sector can remove some of these obstacles. Humanitarian agencies can teach private companies about life in these camps and settlements, and help them navigate all the operational, legal, and regulatory difficulties that come with it. The humanitarian sector can also support research to assess the ability and willingness of displaced people to pay for better energy. They can help link private companies to the best potential employees. And, in the longer term, these institutions can help people in camps find jobs, offer support in cash instead of support in kind and seek opportunities to address the challenges that their short-term funding cycles cause for long-term planning.

It is not just about access to energy, but access to more: more choice, more impact, and more opportunities.

Host governments also need to step in to enable investment from private companies and reap the benefits of improved energy access for refugees and their host communities. Governments can, for example, allow refugees and other displaced people to move about freely and work. They can also promote clean, off-grid energy by creating or clarifying regulations and providing financial incentives that point consumers and companies towards solar energy. And lastly, governments can demand strict quality and safety standards, to protect these vulnerable consumers from risks that could arise from unmonitored private sector engagement.

Providing energy choices in displacement contexts can only be done by collaborating. While this requires governments, the humanitarian sector and energy companies to overcome historical ways of working, there is significant potential to fundamentally transform millions of lives. It is not just about access to energy, but access to more: more choice, more impact, and more opportunities.

Energy in displacement settings:

The opportunity for private sector engagement

Across the world, the number of people who are forced away from their homes is going up and the time these men, women and children are forced to live in a camp or settlement is becoming longer.

By the end of 2019, almost 79.5 million individuals were forcibly displaced worldwide as a result of persecution, conflict, violence, or human rights violations. This group, also known as 'displaced people', consists of refugees, who crossed a border in search for safety (29.6 million), displaced people who fled their homes but remained in their own country (45.7 million), and asylum-seekers (4.2 million). From 2013 to 2018, the number of refugees in protracted situations, defined by the United Nations High Commissioner for Refugees (UNHCR) as groups of over 25,000 people of the same nationality in exile for over five years, increased from

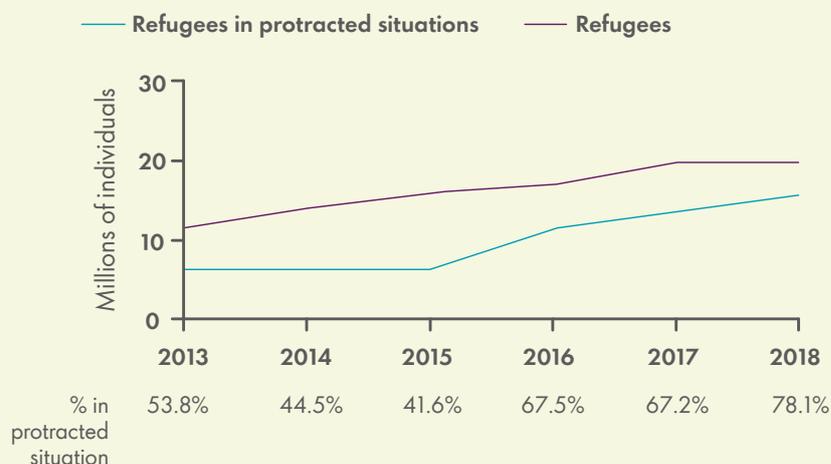
6.3 to 15.9 million. This is caused by the increasing complexity of crises and low rates of resettlement.

Access to energy is important for every aspect of life in and around camps and settlements.

It is required to light public spaces, enables people to cook, and powers the office buildings, health clinics and schools that are run by humanitarian agencies, development organizations, and governments.⁹

However, there is still significant unmet need for cleaner, reliable and affordable energy solutions. Over 80% of displaced persons in camps have no access to reliable¹⁰ electricity and use

Figure 1: Number of refugees in protracted situations⁹ Global, 2013-18



⁸ UNHCR, "Global Trends Report", 2013-2018

⁹ Sarah Rosenberg-Jensen, Research in Brief: Refugee Energy, 2018

¹⁰ MEI, "Heat, Light and Power for Refugees", 2015



¹¹ UNITAR, "The Global Plan of Action for Sustainable Energy Solutions in Situations of Displacement", 2018

¹² UNCHR, "Uganda Country Refugee Plan", 2018-19

^{12.5} The estimate is based on the current camp-level fuel mix in line with Lehne et al (2016), "Heat, Light and Power for refugees", and emissions factors for each technology/fuel combination based on a range of sources including: WHO, "Review 2: Emissions of health-damaging pollutants from household stoves", table 1; Carbon Trust (2016) "Energy and carbon conversion factors", table 1; Lam et al (2012), "Household light makes global heat: High black carbon emissions from kerosene wick lamps", table 1; and IBRD (2014), "Diesel power generation: inventories and black carbon emissions in Nigeria", table 12.

¹³ Sarah Rosenberg-Jensen, *Research in Brief: Refugee Energy*, 2018

¹⁴ Pico products include small, portable solar lanterns, flashlights, or lanterns designed to meet basic lighting needs as a direct replacement for kerosene lamps, commonly sized <10Wp. "Off-grid solar market trends report", 2020

¹⁵ Solar Home Systems have a solar panel rated 11 Wp and higher and include both home lighting systems and large systems which can power appliances. "Off-grid solar market trends report", 2020

¹⁶ OCHA Services, Clusters

¹⁷ UNHCR, "Financial reporting", 2013-18

traditional biomass, such as firewood, for cooking. Access to energy is key to addressing issues linked to security, shelter, protection, health, livelihoods and climate change.¹¹ Women and children, for example, often face security challenges, including gender-based violence, while they are spending anywhere from 12 to 24 hours a week collecting firewood for cooking.¹² In our research in the Bidi Bidi camp in Uganda, only 8% of households were very satisfied with the amount of lighting in their home. Four in five households claimed that a lack of lighting limited their children's education. Three in five suggested it hindered their social life. One in six reported it inhibited their ability to earn an income. But not just the people living in the camps have trouble with access to affordable, reliable and clean energy. Humanitarian institutions also rely on expensive and inefficient diesel generators to power most of their facilities. Estimates show that using diesel in displacement settings produced 67 million tonnes of carbon dioxide emissions in 2018.^{12.5}

Whereas off-grid solar technologies could solve the unmet need for power and lighting, the problem with cooking is often the result of logistics and tradition.

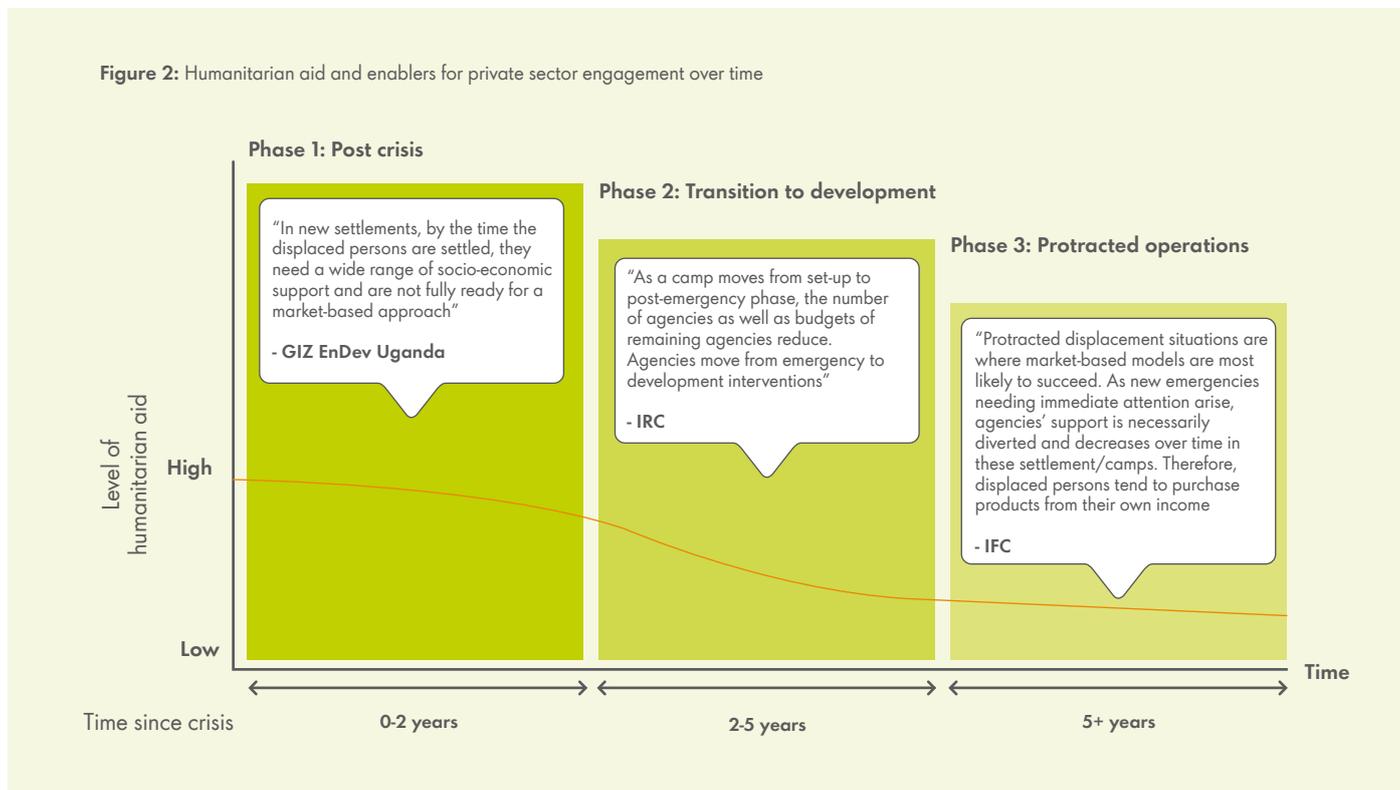
Existing off-grid renewable (namely solar) solutions are well-suited to meet the energy needs of displaced people.¹³ In addition, solar PV prices have been declining and Li-ion battery costs fell 85% between 2010 and 2018. The manufacturing costs for Pico products¹⁴ and Solar Home Systems¹⁵ have also declined by 3-10% and 5-15% respectively in the past two years alone.¹⁶ However, historical reliance on free firewood, inexpensive charcoal and the complexity of setting up new fuel supply chains make a transition to new cooking technologies difficult.

Long-term energy planning is not a core competency in the humanitarian system. Energy is not historically part of the humanitarian cluster approach, which is adopted by agencies to quickly react to crises by assigning responsibility to, and coordinating across, specific aid organisations.¹⁷ The humanitarian sector's core mandate is to meet the most immediate, urgent needs after a crisis and

We are at a watershed, where success in managing forced displacement globally requires a new and far more comprehensive approach so that countries and communities aren't left dealing with this alone.

Filipo Grandi, UNHCR

Figure 2: Humanitarian aid and enablers for private sector engagement over time



All refugee settlements and nearby host communities will have access to affordable, reliable, sustainable and modern energy by 2030.

UNHCR

¹⁸ UNHCR, “Needs and funding requirements”, 2016-17

¹⁹ UNHCR, Comprehensive Refugee Response Framework

²⁰ As at December 2018, the following countries have opted to apply the CRRF and related concepts: Belize, Costa Rica, Guatemala, Honduras, Mexico, Panama, Djibouti, Ethiopia, Kenya, Somalia, Uganda, Zambia, Afghanistan, Rwanda and Chad Per the UNHCR Two Year Progress Assessment of the CRRF Approach

²¹ As at December 2018, the following

tends to apply standardized procurement and hand-out approaches in these situations. The limited ability to plan for energy needs after that first phase adds to the lack of choice of energy solutions that displaced communities face in the long-term.

Unmet funding needs¹⁸ and annual budget cycles compel humanitarian agencies to prioritise short-term needs. Responding to emergencies takes up most of the budget of humanitarian agencies. In 2015, for example, the funding requirements of emergencies resulted in longer established camps having to drop all but the most urgent life-saving aid.¹⁹ Facing this funding reality and the increasing average length of displacement, the humanitarian sector is increasingly adopting longer-term views on energy planning that include

partnerships with the private sector to find sustainable and cost-efficient solutions to serve the energy needs of displaced people.

Recent policy changes make it possible to start bridging the gap between humanitarian aid and longer-term development. The Global Compact on Refugees, built on the 2016 Comprehensive Refugee Response Framework²⁰ (‘CRRF’, see box below) aim to change the way displaced persons are supported – away from providing only for immediate needs and protection towards helping build self-reliance and facilitate longer term social and economic inclusion between refugee and host communities. The CRRF is currently signed by 15 states.²¹ In 2019, UNHCR also launched the Clean Energy Challenge²², which aims to provide people in and around

In the rapidly developing energy sector, the private sector will be a key part of delivering sustainable energy solutions. The ambition of UNHCR to broaden its engagement with the private sector in renewable energy and encourage opportunities for technological innovations is in line with the multi-stakeholder and partnership approach called for by the GPA²⁴ and Global Compact on Refugees.

UNHCR

countries had opted to apply the CRRF and related concepts: Belize, Costa Rica, Guatemala, Honduras, Mexico, Panama, Djibouti, Ethiopia, Kenya, Somalia, Uganda, Zambia, Afghanistan, Rwanda and Chad Per the UNHCR Two Year Progress Assessment of the CRRF Approach.

²² UNHCR, *Clean Energy Challenge*, 2019.

²³ As per the ESMAP Global Tracking Framework, Tier 2 electricity includes 4-8 hours of uninterrupted service per day allowing for general lighting, television, fans. *Beyond Connections - Energy Access Redefined*, 2015.

²⁴ *The Global Plan of Action for Sustainable Energy Solutions in Situations of Displacement (GPA)*

About UNHCR's Comprehensive Refugee Response Framework (CRRF)

In September 2016, the United Nations General Assembly unanimously adopted the New York Declaration for Refugees and Migrants. This declaration aimed to provide greater support to refugees and the countries that host them. To implement the declaration, and build a world where refugees can “thrive, not just survive”, the Comprehensive Refugee Response Framework focuses on the early inclusion of refugee into host communities. Governments that adopt the CRRF pledge to implement laws and policies that protect refugees’ human rights and make it possible for them to work and move about freely. The goal is to allow refugees to live up to their potential and facilitate their path to self-reliance such that they can be less dependent on humanitarian aid and contribute to their host communities.

Building on the CRRF, the Global Compact on Refugees, adopted by all UN Member States in 2018, focuses on the need for cooperation between governments, international organizations, NGOs and also the private sector to jointly develop more sustainable solutions to refugee situations. The Compact aims to enable refugees and host communities to “mutually empower each other, socially and economically” through integration and the sharing of benefits.

camps and settlements with Tier 2²³ access to electricity and modern cooking by 2030. The Comprehensive Refugee Response Framework and the Clean Energy Challenge signal fundamental policy shifts: they enable long-term planning, a focus on giving energy choices to the displaced, a preference for cleaner, more cost-effective energy sources in line with the UN’s Sustainable Development Goals and the realisation that achieving these long-term ambitions will only be possible in partnerships with the private sector.

Achieving energy access in displacement settings in an affordable, efficient and sustainable way needs the help of the private sector. The private sector offers three advantages: first, dignity of choice – when offered a wide variety of products and services, displaced people can choose the energy that is most relevant to them. Markets provide this choice and private companies know how to set up

markets. Second, speed and innovation – energy access companies have been successful in rural off-grid markets that have similarities with displacement settings and can, given the appropriate access and guidance, adapt their business models to serve refugees and their host communities. Third, sustainable operations and scalability – private companies can help set up and scale up markets that can supply energy in a sustainable way, with decreasing subsidies over time, and designed in a way that they are untethered to the annual budget constraints of the humanitarian sector. In the spirit of the Global Compact on Refugees, collaboration between humanitarian and development agencies, governments, and private sector should lead the way forward – also for energy access.

Energy in displacement settings in a post COVID-19 world – a chance for more or an even harder challenge?

As the development of report was in its final stages, the longer-term impacts of the COVID-19 pandemic on energy systems were still unclear. While it appeared that some social and economic effects of the virus could slow down progress in the development of energy markets in and around camps and settlements, others might accelerate it.

Camps and settlements are particularly vulnerable to the COVID-19 pandemic. Camps, for example, have limited healthcare, displaced persons with malnutrition often have a weaker defence against the virus, and the high population density makes social distancing in camps challenging. This means access to reliable, affordable cleaner energy has become even more important during this pandemic, especially since we know from the past that a crisis like COVID-19 could increase the total number of displaced people in the world.

Still, some of the effects of COVID-19 could slow down the development of energy markets in and around camps and settlements. The budgets of humanitarian institutions and aid agencies might get cut. Governments might focus on economic recovery instead of energy for displaced people. And employment and income could fall in and around camps and settlements, reducing displaced people's ability and willingness to pay for energy.

On the other hand, there are also developments that could speed up access to energy in and around camps and settlements. COVID-19, for one, could be a catalyst for a more rapid transition to a cleaner energy system. As governments devise recovery packages, there is an opportunity to use this spending to meet long-term decarbonisation goals. The European Union, for example, has emphasised the need for such a "green recovery".

Also, the off-grid solutions that are needed in camps and settlements can offer the opportunity to create

much-needed employment and boost local economies.

And perhaps most importantly, off-grid energy supply could be considered an essential service in areas where energy access is limited, as also advocated by GOGLA. This could work as a catalyst for providing access to energy in camps and settlements. Because without access to energy, the effects of COVID-19 in camps and settlements are even worse. Social distancing, for example, only works if communication with authorities is possible and this requires power for mobile phones, radios and televisions. Also, doctors and nurses need electrically powered medical equipment to treat infected people. To give just one example, only 28% of health facilities in Sub-Saharan Africa currently have access to reliable electricity. A shortage of power also limits vulnerable populations' access to a vaccine once there is one, because most vaccines require refrigerated transport and storage.

There is much uncertainty about the effects of COVID-19 on access to energy in and around camps and settlements. Since some expected effects slow the development of energy markets down and others speed it up, we have decided against changing key assumptions of the report.

→ *The next section of this report will look at the current and future energy needs in and around camps and settlements and illustrates the positive economic and social impact that addressing these needs can bring.*

Energy needs in displacement:

Understanding demand and impact

A

Quantifying current and future energy demand

²⁵ Camp and settlement population data was sourced from the UNHCR statistics database and the UNRWA annual figures reports from 2018. Host community data was sourced from the UNHCR Clean Energy Challenge baseline. The model assumed ~5.66 million host community households, ~2 million displaced person households and ~470,000 businesses.

²⁶ Dalberg analysis – modelled estimates

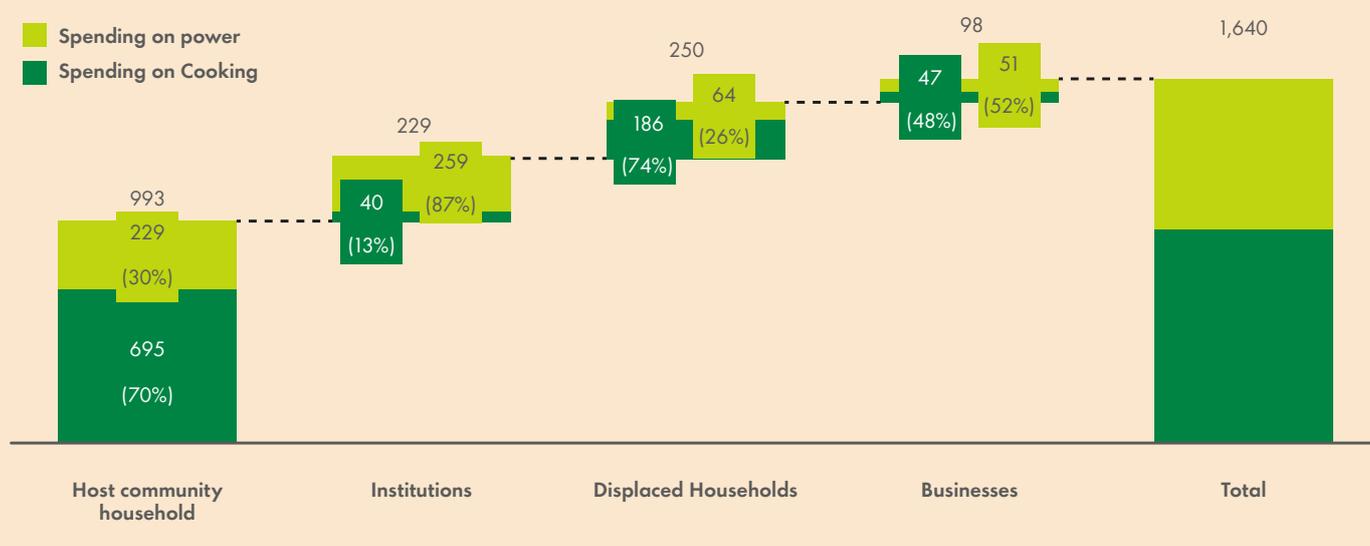
People who live and work in and around camps and settlements spend more than \$1.6 billion per year on power and cooking (Figure 3).

While a few camps are connected to the electrical grid, the majority are located in remote locations with limited access to energy of all types. The majority of estimated current spending on energy comes from host community households. These families, who live just outside camps and settlements, usually have a larger and more dense population than in camp households.²⁵ Humanitarian institutions represent the second largest

share of spend. This is made up by power needs for office compounds, community infrastructure like hospitals, schools, water pumps, streetlights, and in-kind energy support for new entrants and vulnerable populations, such as torches. Displaced person households currently reflect around 15% (\$250 million) of the overall demand. Businesses, while a vibrant part of many camps, currently spend relatively little on energy.

Host community households are closely connected to nearby camps and settlements. They often share a marketplace, energy resources,

Figure 3: Breakdown of estimated annual energy spending in camps and settlement by primary user types²⁶





and humanitarian aid. In fact, policies in several countries require a set percentage of all humanitarian aid to be distributed to host community households. Uganda's framework, for example, ensures a 30/70 balance of aid distribution between host community and displaced person households. UNHCR and other organisations often target a 50/50 balance.²⁷ While different policy frameworks result in varying levels of engagement between host and displaced communities, they often face similar energy access challenges, and hence form important energy consumers that should be actively addressed as solutions to energy

access in displacement are discussed.

Cooking makes up the majority of energy spending for households.

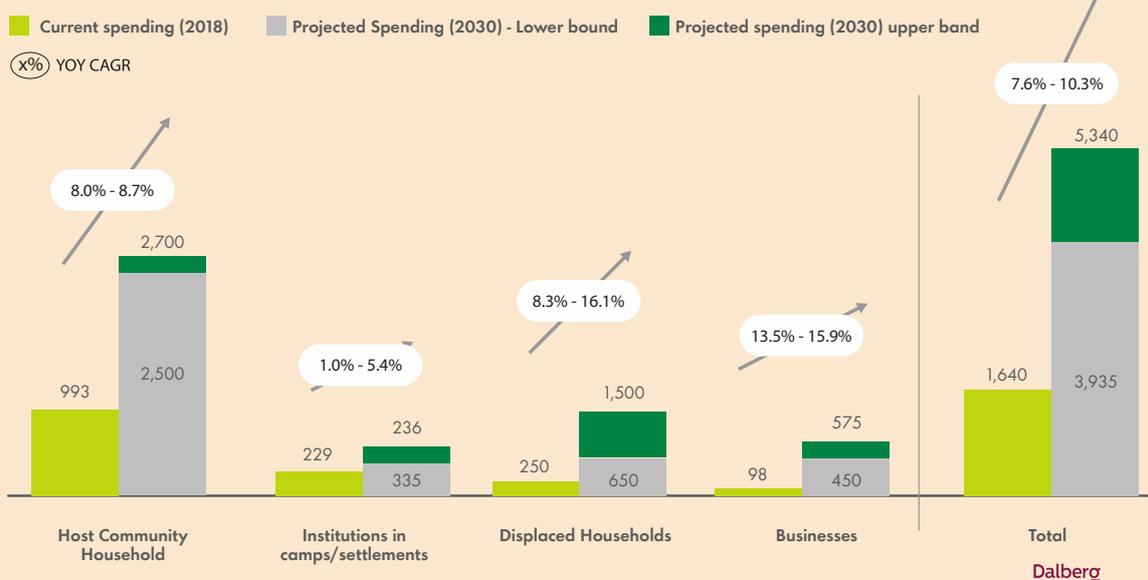
74% of total energy spending of displaced households goes to cooking. For host community households, it is 70%. And this is despite the fact that many of these households depend on free firewood. This cooking spend reflects the high unit prices for purchasing charcoal and alternative fuels where firewood is scarce. Some households, particularly in the host community where incomes are higher, prefer charcoal since it can be more comfortably used indoors. Cooking spend is also driven by the fact that much of the food aid distributed is dry or non-perishable and needs to be cooked for a long time.

The remaining, approximately 30% of household energy spending, is primarily for basic lighting.

As discussed, at the onset of a crisis, displaced households are often provided with free solar lanterns. In some cases, they sell or barter these in exchange for cooking fuel. In the longer run, free lanterns are often replaced with battery-powered torches, other Pico solar lanterns, or makeshift LED lights attached to dry-cell batteries – all of which require continuous spending to ensure longevity. In either case, people prioritize spending on energy related purchases as it enables basic human needs: food and safety. Energy demand would increase with access to affordable and reliable products. If relevant energy products were available at appropriate price points or payment plans in local markets today, refugees and other displaced people are estimated to increase their spend by 15-20%, host community households would likely increase spend by 45-55%, and energy spend by businesses would likely increase by 5-10%.

²⁷ Reliefweb, *Can Uganda's Breakthrough Refugee-Hosting Model be Sustained*, Nov 2018

Figure 4: Estimated annual projected potential energy expenditures in displacement settings



In 2030, the estimated potential demand in displacement settings could reach between \$3.9 billion and \$5.3 billion. This increase, of at least 7.6% per year over the next decade, would primarily be driven by three factors, which will be further discussed in Section 4 of this report:

- An increase in supportive policies such as the right to work, freedom of movement, and transition from hand-outs to cash-based assistance, which are likely to translate into higher incomes, and therefore greater energy use for displaced households.
- More policies and institutional interventions which are favourable to

²⁸ The projected expenditure assumes that all energy consumers will spend as per their maximum potential - i.e. access to and awareness of off-grid energy solutions are prevalent in all camps.

the private sector. This will likely result in wider choice and greater coverage of relevant, affordable energy products for energy users.

- As mentioned above, the displaced population is growing, and a greater percentage of this population is likely to stay displaced for longer. This longer stay changes people's energy needs - for example to power more appliances or using electricity to re-build their livelihoods.

Given the uncertainty of displacement settings, the estimated demand in 2030 could vary between \$3.9 and \$5.3 billion. The lower bound estimate of \$3.9 billion assumes a slower growth rate of the number of people living in displacement, and only a partial improvement in the policy environments that enable refugee self-sufficiency among countries that have already

adopted the CRRF. The upper bound estimate of \$5.3 billion assumes the number of refugees and other displaced people keeps developing as it has been doing historically. It also assumes new countries will adopt the CRRF, and that the implementation of CRRF will improve in form of tangible policy reform and enforcement. Figure 4 outlines the rising energy need in this more optimistic scenario, and section II.B below explores the detailed view of each user segment.

→ To unpack these estimates around current and future aggregate demand, the next section will shed a light on the ability and willingness to pay for energy services across the four primary energy users in displacement settings: institutions, displaced person households, host community households, and businesses.

B

Exploring the four consumer groups driving energy demand



²⁹ This number covers energy expenditure only in and around camps and settlements. It does not include expenditure on diesel for vehicles, and any energy expenditure outside camp settings like diesel use in disaster situations. This number is less than the estimates from the Moving Energy Initiative study “The cost of fuelling humanitarian aid”. Where MEI used a top down approach to estimate total diesel consumption (inclusive of related costs) by taking a percentage of the total humanitarian budget, this study estimated diesel usage by using a bottom up approach - estimating the number of facilities operating in each camp and then assigning an expected power usage for each of those facilities based on interviews with humanitarian organisations.

³⁰ IOM, Rohingya Refugee Camps turn to LPG, reforestation to save depleted Bangladesh Forests, May 2019

³¹ A study by UNEP DTU, “The True Cost of Using Traditional Fuels in a Humanitarian Setting”, 2017 on Nyarugusu Camp, Tanzania showed that supplying the entire camp population of ~150k displaced persons with LPG stoves and fuel would cost roughly \$7 million a year.

Humanitarian and development organisations

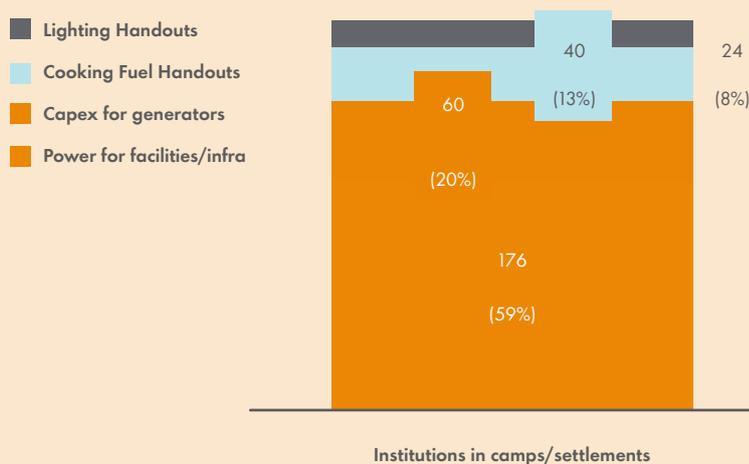
Humanitarian and development organisations play important roles in delivering energy services in camps and settlements. UNHCR is responsible for protecting the refugees and other displaced persons. As part of this broad mandate, UNCHR selects partners to help deliver sector-specific solutions for displaced persons. These partners include other UN agencies and humanitarian organisations, and local and international NGOs that organise healthcare and education and supply food, energy, water and shelter.

Energy demand of these institutions amounts to around \$300 million²⁹ annually, primarily for powering offices and facilities and directly providing energy support to vulnerable populations. The cost

for purchasing handouts like small solar lanterns that are provided to vulnerable populations and new arrivals into camps makes up 21% of this spend. Cooking fuel handouts have been increasing in recent years and are estimated to equal nearly \$40 million. Many host countries have experienced deforestation as a result of collection of firewood by displaced persons. This often leads to conflicts with the host community over forest use. Some host governments have worked with humanitarian institutions to adopt policies to encourage (and in some case require) the use of alternative fuels to reduce deforestation.³⁰ In these communities, institutions have been supporting the collection of firewood from sustainable sources or directly financing the use of cooking fuels that do not draw from the host community environment, such as the promotion of LPG stoves in Nyarugusu camp in Tanzania.³¹ If fully subsidized,

Figure 3: Figure 5: Breakdown of estimated annual institutional expenditure on energy

\$millions, Percentage of total, Estimate 2018



greenhouse gas emissions, for example the Sustainable Development Strategy 2017-2020 of the International Committee of the Red Cross³³, IOM's Environmental Sustainability Programme³⁴ and UNHCR's Clean Energy Challenge. The increasing strength of local supply chains in Sub-Saharan Africa and Asia also means that institutions can access solar energy solutions more easily than previously, which further reduces the need to rely on diesel.³⁵

Greater use of higher quality energy products would decrease spending by institutions. Many institutions have mis-sized diesel generators that are too large or too small for their often intermittent needs. This leads to sub-optimal generator operations or underpowered facilities. For example, some health centres in Bidi Bidi cannot simultaneously operate several pieces of equipment due to an underpowered generator. With access to reliable, cheaper and modular solar energy, institutions could adjust their energy generation to exactly fit their needs. This could simultaneously reduce energy spending and increase the total amount of energy available. Despite high upfront costs, a solar system can become more economical than a diesel generator in as little as 3.5 years, depending on the financing option³⁶ and the quality of the system.³⁷

However, procurement challenges may limit the speed at which institutions can adopt solar power generation. When compared with diesel procurement, humanitarian procurement officers are less familiar with renewable energy systems.³⁸ This has led to selecting lower-quality solar systems and poorly designed installations in the past.³⁹ To remedy this, some organisations have appointed "energy coordinators".⁴⁰

these initiatives can be expensive and are unlikely to be supported in the long-run, making financially sustainable cooking solutions and delivery methods necessary.

To date, most organisations have relied on diesel generators for power. Diesel represents an estimated 80% of the energy consumption of humanitarian organisations. Diesel sourcing strategies are well established in the humanitarian world. As they require relatively little upfront investment and can be ramped up or down to meet variable energy demand, diesel generators enable organisations to set up operations quickly. The remaining 20% of total spend goes to solar and national electricity grids, where they exist.³²

However, these institutions are increasingly willing to switch to cleaner energy technologies. Public and private funders are increasingly demanding sustainable operations, which drives humanitarian and development institutions to set goals to reduce their

³² Stakeholder interviews

³³ Red Cross and Red Crescent Climate Center, Strategy 2017-2020

³⁴ IOM, Institutional Programme on Environmental Sustainability

³⁵ Lighting Global, ESMAP and GOGLA, "Off-Grid Solar Market Trends Report 2020", 2020; ESMAP, "Mini Grids for Half a Billion People: Market Outlook and Handbook for Decision Makers", 2019

³⁶ Financing could be based on grants, lease agreements or Power Purchase Agreements.

³⁷ UNITAR and GPA, "Sustainable energy provision in humanitarian settings", 2019. Quality standards for mini-grids include those defined in National Renewable Energy Laboratory, "Quality Assurance Framework for Mini-Grids", 2016, while Lighting Global quality standards are commonly used for smaller systems.

³⁸ Stakeholder interviews

³⁹ UNITAR and GPA, "Sustainable energy provision in humanitarian settings", 2019

⁴⁰ Stakeholder interviews



Displaced person households

As people stay in camps and settlements longer, their energy needs change, increasing their annual expenditure on energy. For example, data suggests that the longer people live in camps, the bigger the chance they own a solar home systems (SHS). In Rwanda, 5% of displaced households owned a SHS in Kigeme camp (6 years tenure), 14% in Nyabiheke camp (13 years), and 28% in Gihembe camp (21 years).⁴² This is driven by a shift in the mindset of households over time and decreasing aid-based support as a camp or settlement ages. Households that are newly displaced tend to focus primarily on repatriation, which means they are less willing to invest in new energy assets. Over time, families begin to invest in the longer-term, which includes meeting more complex energy needs.

Populations within and across camps and settlements are diverse, so is their energy demand. One-size-fits-all options for energy, often the only approach possible with traditional top-down procurement of aid-based support, do not offer the choice that would better cater to the diverse needs of displaced persons within and across regions. Even in a single geographic cluster in Ethiopia (Figure 6), three camps vary significantly. Many camps or settlements are made up of populations from several different countries, with varying prior education backgrounds, economic earning potential, or prior exposure to access to energy. The range in median monthly income in camps can also be significant, for example from \$96 to \$117 per month in Kakuma, Kenya or \$58 to \$193 per month in Nakivale, Uganda.^{43,44} Families who were accustomed to a grid in their home countries have significantly higher

This, however, does not take away all difficulties with contracts. For example, humanitarian agencies cannot enter into power purchasing agreements with providers for more than one year and contracts with UN agencies can be terminated with only 30 to 60 days' notice.⁴¹ Addressing these challenges will allow for faster adoption of solar energy by institutions.

We currently can meet only 80% of our energy requirements. If a patient has to use an incubator in the morning, we usually have no lighting available that night.

Health Officer, International Rescue Committee

⁴¹ UNITAR workshop series on "Electricity for humanitarian agencies in humanitarian settings"

⁴² <http://heed-refugee.coventry.ac.uk/data-portal/>

⁴³ Betts, A et al, *Refugee economies in Uganda, What difference does the self-reliance model make?*; 2019

⁴⁴ Monthly incomes were converted to USD at purchase power parity exchange rates

Figure 6: Distribution of refugees in Ethiopian camps based on their tenure⁴⁵

Percentage of respondents, N=270, 2019



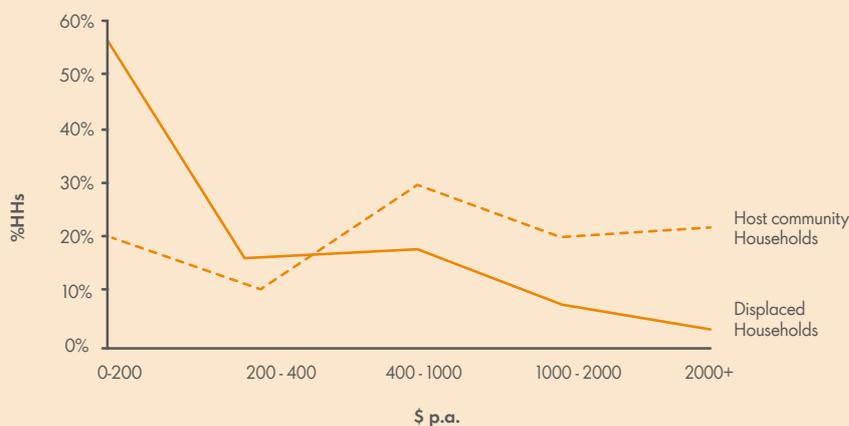
demand than those who weren't. Our research suggests, for example, that most people who own solar panel systems in Bidi Bidi were connected to the grid or used solar products in their country of origin. Demand differs significantly, and the availability of choices to meet these variable needs matters.

Aid and institutional support provide a minimum income to refugees. Average annual incomes per household within Ugandan camps and settlements (\$413) are lower than the poorest host community households

(\$1,640) (Figure 7). Seventy-eight percent of displaced person households in these settlements receive financial or in-kind support.^{46,47} Aid and pay in camps is consistent throughout the year. So, displaced person households are less affected by the seasonal variation in wages than host communities. This is manifested in a somewhat similar willingness to pay for power across both communities, as discussed below. While more research on this is required, overall incomes of displaced people are likely to increase if right-to-work policies

Figure 7: Comparison of income distribution in displaced person and host community households in Bidi Bidi settlement, Uganda

Displaced Households: Average income, \$p.a., N=371, 2020
 Host community Households: Average income \$p.a., N=201, 2020



⁴⁶ FSD Uganda, "Financial inclusion for refugees: Results of baseline survey", 2020

⁴⁷ Dalberg, Business Surveys in Bidi Bidi settlement, Uganda 2020

Figure 8: Displaced households' willingness to pay per month for 8 hours of electricity USD per month, % of sample, N=375, Bidi Bidi, Uganda, 2020



⁴⁸ Dalberg, *Business Surveys in Bidi Bidi settlement, Uganda 2020*; IFC, *"Kakuma as a marketplace"*, 2018

⁴⁹ Findev Gateway (CGAP), *"Removing barriers to expand access to finance for refugees"*, 2017

⁵⁰ Some reasons include strict identification and collateral requirements (e.g. in Bidi Bidi, even though refugees are given land to farm on, they do not own it), and difficulty of proving creditworthiness (e.g. proof that they won't return to their country of origin soon).

⁵¹ FSD Uganda, *"Financial inclusion for refugees: Results of baseline survey"*, 2020

⁵² It is important to note that some of the difference between stated willingness to pay and market price can also be attributed to the general tendency to under-report in developing nations, especially in these settings due to the fear of aid being withdrawn.

⁵³ Ministry of Energy and Mineral Development, Uganda, *"Uganda rural-urban electrification survey"*, 2012

⁵⁴ GVEP/MEI, *"The Energy Situation in the Dadaab Refugee Camps, Kenya"*, 2016

⁵⁵ The output power achieved by a solar module under full solar radiation.

⁵⁶ Note that these prices used to test responses do not necessarily capture the true price of a product in these settings, given that transportation and logistics would likely drive these costs up further.

for displaced persons are increasingly implemented across countries.

Mobile banking and new, informal ways to save money are increasing the possibilities for displaced persons to save for larger purchases.

In the past, few displaced persons owned⁴⁸ or were permitted to have⁴⁹ a bank account, and even fewer ever borrowed from formal institutions.⁵⁰ This is changing, especially in host countries where the use of mobile money is prevalent. Refugees in Ugandan settlements, for example, were at least 20% more likely to have mobile money access in Uganda than in their country of origin.⁵¹ Banks such as Equity Bank and Post Bank have begun to provide formal financial services to refugees in Kenya and Uganda and are planning to scale up their investment. These banks are tailoring their services, for example by offering short term loans with less stringent needs for collateral. This can help the financial inclusion of people in camps and settlements. Access to credit will increase the ability to pay for larger products. It can also absorb some of the investment risks for energy enterprises.

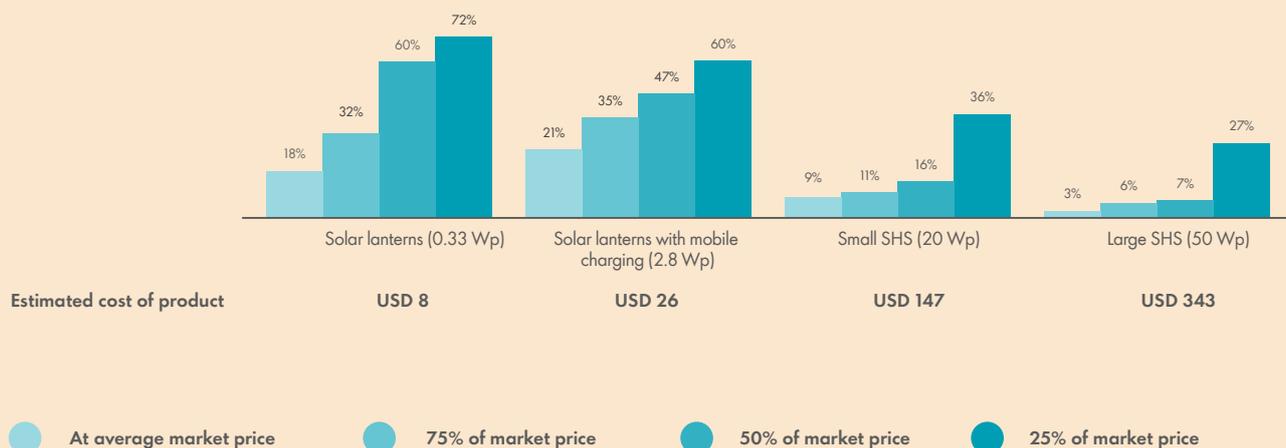
The model underlying this research suggests there is relatively high demand and willingness to pay for power, specifically for smaller products.⁵²

As illustrated in Figure 8, over 90% of surveyed households in Bidi Bidi, Uganda, would pay for power, and displaced households were on average willing to pay an amount comparable to the typical amounts rural Ugandan households paid monthly for electricity (the equivalent of \$2.7).⁵³ In Kakuma, Kenya, displaced persons were willing to pay \$8.6 per month for reliable grid supply. This is only slightly lower than the \$10 monthly that most East Africa-based solar pay-as-you-go (PAYGO) companies ask for a solar home system over a three-year period.⁵⁴ While there is also demand for small solar products, the prevalence of free, handed out lamps and lanterns is impacting the willingness to pay. Only 18% of surveyed respondents were willing to pay average market prices for a simple solar lantern (.33 watt-peak, Wp) and 21% were willing to pay market prices for lanterns with mobile charging capability (2.8 Wp). Only 9% of households surveyed in Bidi Bidi reported a willingness to pay average market prices for a small solar home system (20 Wp)⁵⁵ and 3% did so for a large system (50 Wp) (Figure 9).⁵⁶ Similarly, just one-quarter of displaced persons in Goudoubo, Burkina Faso, and one-fifth in Kakuma I, Kenya, were willing to pay the market price (\$126

Access to credit will increase the ability to pay for larger products. It can also absorb some of the investment risks for energy enterprises.

Figure 9: Comparison of households prioritization of energy products and their willingness to pay w.r.t market price⁵⁸

% of households, n(solar lantern)=50; n(solar lantern + charging) = 43; n(small SHS)=90; n(large SHS) = 94, Bidi Bidi settlement, Uganda; 2020



⁵⁷ MEI, "Prices, Products and Priorities: Meeting refugees' energy needs in Burkina Faso and Kenya", 2017

⁵⁸ The survey in Bidi Bidi presented the respondent with the name, a short description of its benefits and a picture of the technology. The respondent was asked their monthly willingness to pay for each technology. Given that lanterns are typically purchased in one transaction, we have assumed that the respondent would understand the question to mean the full price of the product, therefore we have used the response given to be their willingness to pay for the product in question. For the SHS we have assumed that the product would be purchased using a monthly PAYGO payment and thus the monthly willingness to pay for the 2 SHS products were multiplied by 12 to be comparable with the total estimated market price. (Dalberg, Household surveys in Bidi Bidi settlement, 2020)

⁵⁹ The Globe and Mail, Changing the temporary mindset of refugees (2015)

⁶⁰ Households were asked to prioritise their next energy purchase (included both power and cooking options) by preference. Total figures do not sum up to 100% as respondents were allowed to choose more than one priority item.

⁶¹ DTU, "The true cost of using traditional fuels in a humanitarian setting. Case study of Nyarugusu camp, Tanzania", 2017; age, education and employment positively and significantly influenced willingness to pay

per unit) for an entry level solar home system.⁵⁷

The willingness to pay for solar products depends on price, awareness and livelihood opportunities. Households in displacement settings are highly price sensitive, as overall incomes are low and low-cost (though often low-quality) alternatives tend to be available. Solar products can also be seen as an aspirational good. Households are driven to purchase solar products as a symbol of success and wealth. Actively increasing awareness of the longevity and the associated longer-term financial impacts of higher quality products is important. Lastly, given that larger solar products are a long-term investment, access to employment or education are likely to drive families' willingness to invest.⁵⁹

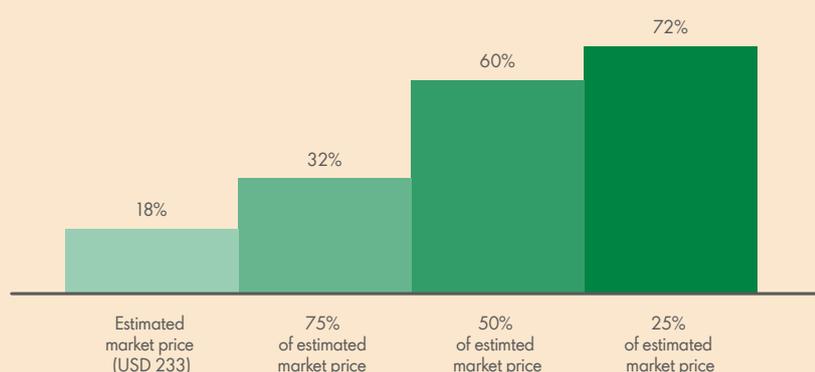
In comparison to improved power and lighting, displaced person households' willingness to pay for cooking solutions remains limited. Nearly 60% of displaced person households in Bidi Bidi are unsatisfied

with the availability of cooking fuel and resort to coping strategies like skipping meals or bartering aid when fuel is unavailable. Still, only 18% of these households identified clean cooking solutions as their next purchase⁶⁰ and only 3% of those were willing to pay close to market prices. Despite any potential bias in survey response due to the fear of aid being withdrawn, these numbers are low. Similarly, in the Nyarugusu camp in Tanzania, even though 95% of households reported some willingness to pay to refill LPG gas cylinders, they were willing to pay only 12% of the cost of the fuel.⁶¹

Top-down strategies are likely the only way to encourage a transition to cleaner cooking solutions.

Unrestricted access to free or cheap alternatives like firewood, cultural barriers such as taste and the high cost of new stoves and fuels make the adoption to new cooking solutions difficult. Conversion to cleaner cooking options likely needs to be accompanied by heavy aid-supported incentives. In 2016, for example, UNHCR distributed LPG stoves

Figure 10: Households willing to buy a clean cooking solution (with benefits that match those of an LPG stove)^{62, 63}
% of sample (DP households), N=66, Bidi Bidi, Uganda, 2020



and fuel cylinders to more than 3,000 households in Nyarugusu camp, Tanzania and saw firewood demand drop by 70% among this group.⁶⁴ These approaches will however not be financially sustainable in the longer run.

Demand subsidies are important to stimulate the uptake of new cooking and electricity solutions in the short to medium term. A transition from in-kind to cash-based support will increase the ability and willingness of displaced people to pay. It could also help to shift away from a mindset of dependency towards one of self-reliance in the long term, in line with the priorities of the Global Compact on Refugees. In the short and medium term, however, subsidies are still necessary, as the data above suggests. As shown in Figure 10, the proportion of households willing to pay for power and cooking products increases two- to four-fold as subsidies increase. On the supply side, donor funding should be used to keep end-consumer costs low, as it has been done in other off-grid settings.

⁶² Annualized cost of LPG is Sub-Saharan Africa; World Bank, "Clean and Improved Cooking in Sub-Saharan Africa", 2014

⁶³ The survey in Bidi Bidi presented the respondent with the name, a short description of its benefits and a picture of the technology. The respondent was asked their monthly willingness to pay for each technology. Given that lanterns are typically purchased in one transaction, we have assumed that the respondent would have understood the question to mean the full price of the product, therefore we have used the response given to be their willingness to pay for the product in question. For the SHS we have assumed that the product would be purchased using a monthly PAYGO payment and thus the monthly willingness to pay for the 2 SHS products were multiplied by 12 to be comparable with the total estimated market price. (Dalberg, Household surveys in Bidi Bidi settlement, 2020)

⁶⁴ UNHCR "Gas initiative protecting refugees and improving lives", 2017

⁶⁵ IFC, "Kakuma as a marketplace", 2018

⁶⁶ MEI, "The energy situation in Goudoubo refugee camp", 2016

Host community

Host community households represent the largest percentage of energy demand in displacement settings today, at 60% (around \$993 million). This includes households that are located within 10km of camps and settlements, often interacting significantly with camp inhabitants through trade, jobs or intermarriage. Peripheral host communities are a particularly important energy demand segment, as they have a sizeable population, they often lack access to energy (just like displaced persons), they are usually not connected to the national grid, and they receive limited aid benefits.

Host communities also have greater access to financial services. Prior credit history, access to collateral, and the right paperwork (like national identification) means that host communities almost always have access to finance, even if their access to energy infrastructure is as limited as that of people in the camps. For example, in Kenya, 54% of households in Kakuma town had access to a bank account compared to just 10% of households in Kakuma camp. While most refugees in Kakuma camp borrow from friends and family, most Kenyans in Kakuma town borrow from financial institutions⁶⁵, which increases their overall purchasing power.

Host community households show a similar willingness to pay for power to displaced households – varying by the size of the solution. In Goudoubo camp, Burkina Faso, displaced person households and host community households alike were willing to pay a one-off \$10 charge for a reliable electricity connection.⁶⁶ In Uganda, despite an average income four times that of displaced households,

Host community households represent the largest percentage of energy demand in displacement settings today, at 60%.

Figure 11: Willingness to pay per month for 8 hours of electricity per month
% of host community households vs USD per month, N=201, Uganda, 2020

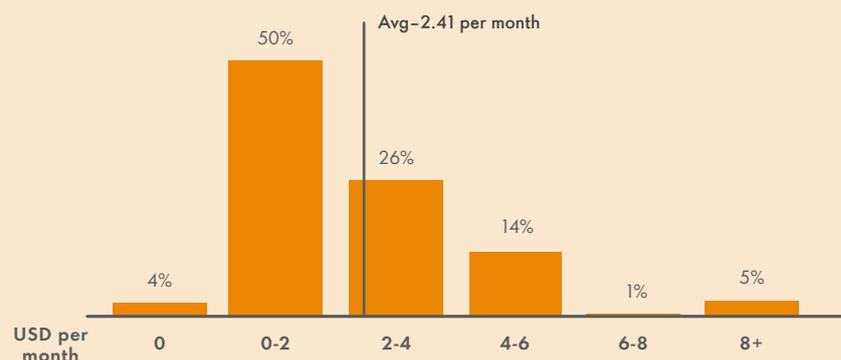


Figure 12: Households willing to pay for clean cooking solution (with benefits that match those of an LPG stove)^{71,72}
% of sample (host community households), N=58, Bidi Bidi, Uganda, 2020



⁶⁷ Host Community households were more likely to use candles (2.5% host vs. 0.8% displaced household), kerosene lamps (3.0% host community v. 0% displaced households) or "Other" light sources (13.9% host community v. 3.2% displaced households). In our research, other lights sources were often self assembled combinations of dry-cell batteries and LED lights to make simple and inexpensive battery powered lights. We note that the use of mobile phones for lighting (25.9% host community vs. 26.4% of displaced households) and battery powered torches (43.3% host community v. 39.6% displaced households) were relatively similar, as was the use of solar home systems (small systems often without batteries / control systems) at 14.4% for host community vs. 14.6% for DP households.

⁶⁸ MISSING IN WORD DOC, PLEASE SUPPLY

⁶⁹ Bond, M. & Aye, Lu & Fuller, R.J., 2010. "Solar lanterns or solar home lighting systems - Community preferences in East Timor," Renewable Energy

host community households expressed a slightly lower willingness to pay for electricity - an average \$2.4 per month compared to \$2.8 per month for eight hours of electricity. A higher proportion of displaced households in Bidi Bidi expressed interest in acquiring a range of solar lighting products than host community households. This is likely driven by a higher exposure to solar products in the past: 43% of displaced households already had portable solar lights, compared to 19% of households in the host community ⁶⁷. Interestingly, despite

this, host community households place higher value on larger products ⁶⁸, and are five to ten times more likely to pay market prices for standard solar home systems than displaced communities. Approximately 54% of host community households who wanted an SHS were willing to pay the full price ⁶⁹.

The willingness to pay for clean cooking solutions, however, may be higher among host community households. 29% of host community households in Bidi Bidi (versus 18% displaced person households) prioritised

[In Tanzania] We had a vibrant marketplace and a high penetration of small businesses including solar products and assets in the camp. However, enforcement of encampment policy has changed the internal economy. Running businesses and shops are currently prohibited, and trade with outside communities is restricted. This has led to marketplaces being shut and the only plausible source of income for refugees being incentive work.

UNHCR/NORCAP



⁷⁰ Only 8% of displaced households surveyed said that they were using a three stone fire as their primary cooking source, instead they were using either a mud stove, improved cook stove or a portable stove for cooking (51%). Out of host community households, 67% said that a three stone fire was their primary way to prepare meals. This likely indicates past clean cooking interventions within the settlement to reduce deforestation and highlights the ability of institution to shape demand and use of energy products within camp settings.

⁷¹ Annualized cost of LPG provided for Sub-Saharan Africa; World Bank, "Clean and Improved Cooking in Sub-Saharan Africa", 2014

⁷² The results shown provide details on a host community household's willingness to pay for a clean cooking LPG stove after they had identified that product as their preferred product to be purchased next (Dalberg, Household surveys in Bidi Bidi settlement, 2020)

⁷³ World Bank, "Kakuma as a market-place", 2016

clean cooking solutions when deciding on their next purchase. Of this group, 23% were willing to pay the average market price (compared to 3% of displaced person households). With minimal food and cooking-related aid, this comparatively higher willingness to pay is likely driven by higher incomes and a lack of alternatives.⁷⁰ However, it is still low and indicative of broader challenges in the uptake of clean cooking solutions.

Businesses in camps

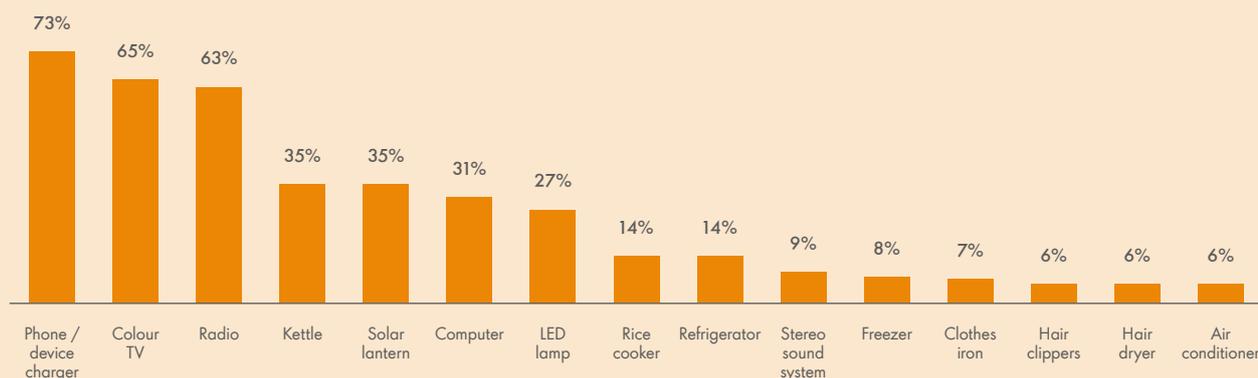
Small businesses can change energy demand in two ways.

First, as policies continue to allow refugees the right to work and in-camp marketplaces develop, businesses will

demand additional energy as they expand or innovate to meet the needs of their customers. Secondly, these camp economies also act as local energy markets, serving as an access point for power, cooking, and other appliances. In many of these shops, low cost energy products (often of poor quality) are already available.

Many camps and settlements already host sizeable internal economies. Some established camps and settlements have marketplaces that rival the economic output of rural towns.⁷³ For example, Kenya's Kakuma camp boosts an estimated 2,000 businesses across various markets within the camp and the peripheral host community. These businesses are supported by the \$56 million in estimated household

Figure 13: Top energy consuming appliances desired by businesses
Percentage of total sample, Rwandan camps, n=155, 2019



expenditures annually and are key to serve local needs. Across surveys of camps and settlements in East Africa, roughly one in ten displaced person households have their own business. Small retail shops, restaurants and beauty salons are common.⁷⁴ There are exceptions, however, based on host country policies. For example, marketplaces in the Nyarugusu camp shut down after Tanzania removed the right to work for displaced persons.

Demand for power among businesses is high, primarily driven by productive use of energy. In fact, multiple business owners in Bidi Bidi purchased energy assets for their businesses before doing so for their homes.⁷⁵ These assets are larger and more expensive than those in households. In our survey, the average cost of a solar system used by a business was \$494⁷⁶, more than ten times the average cost of such a system in a displaced household (\$47).⁷⁷ Furthermore, 86%⁷⁸ of solar systems owned by businesses were purchased outside the camp. For

...small businesses may be an effective way to introduce and create awareness of alternative cooking options.

households, this was only 30%. Demand for appliances like TVs, computers, and refrigerators is also high among businesses (see Figure 13). About 10–15% of businesses in Kakuma, Bidi Bidi, and select Rwandan camps are restaurants or food stalls that rely on cooking fuel.⁷⁹ These entrepreneurs are likely to be the first to buy stoves that are more reliable, start quicker and burn cleaner. Therefore, small businesses may be an effective way to introduce and create awareness of alternative cooking options.

→ The next section touches upon our analysis on regional variations in energy spend.

⁷⁴ Dalberg, *Business Surveys in Bidi Bidi settlement, Uganda 2020*; IFC, “Kakuma as a marketplace”, 2018; HEED, *Surveys in Gihembe, Kigeme, Nyabiheke, Rwanda 2018*

⁷⁵ Dalberg, *Business Surveys in Bidi Bidi settlement, Uganda 2020*

⁷⁶ Dalberg, *Surveys in Bidi Bidi for businesses, Uganda, n=51, 2020*

⁷⁷ Of the SHS purchased, 35% were purchased through a trade with another individual. This explains in part why the average price was so low.

⁷⁸ Dalberg, *Business Surveys in Bidi Bidi settlement, Uganda 2020*

⁷⁹ Dalberg, *Business Surveys in Bidi Bidi settlement, Uganda 2020*; IFC, “Kakuma as a marketplace”, 2018; HEED, *Surveys in Gihembe, Kigeme, Nyabiheke, Rwanda 2018*

C

The geographic distribution of energy demand in displaced settings



There are significant regional variations in energy demand in displaced settings. There are differences in the size of displaced populations, the level of energy access in displaced persons' origin and host country, the type and role of aid agencies involved in the camp, and the host government's policies towards both displaced persons and off-grid energy.

Energy demand in displaced settings (based on expenditure) is particularly large in Asia and East Africa, but policies vary greatly by country (Figure 14). While demand is largest in Asia, no Asian country apart from Afghanistan signed up to the CRRF⁸⁰, which suggests a lower level of policy support for displaced persons. By comparison, the market in East Africa is smaller, but countries within the region

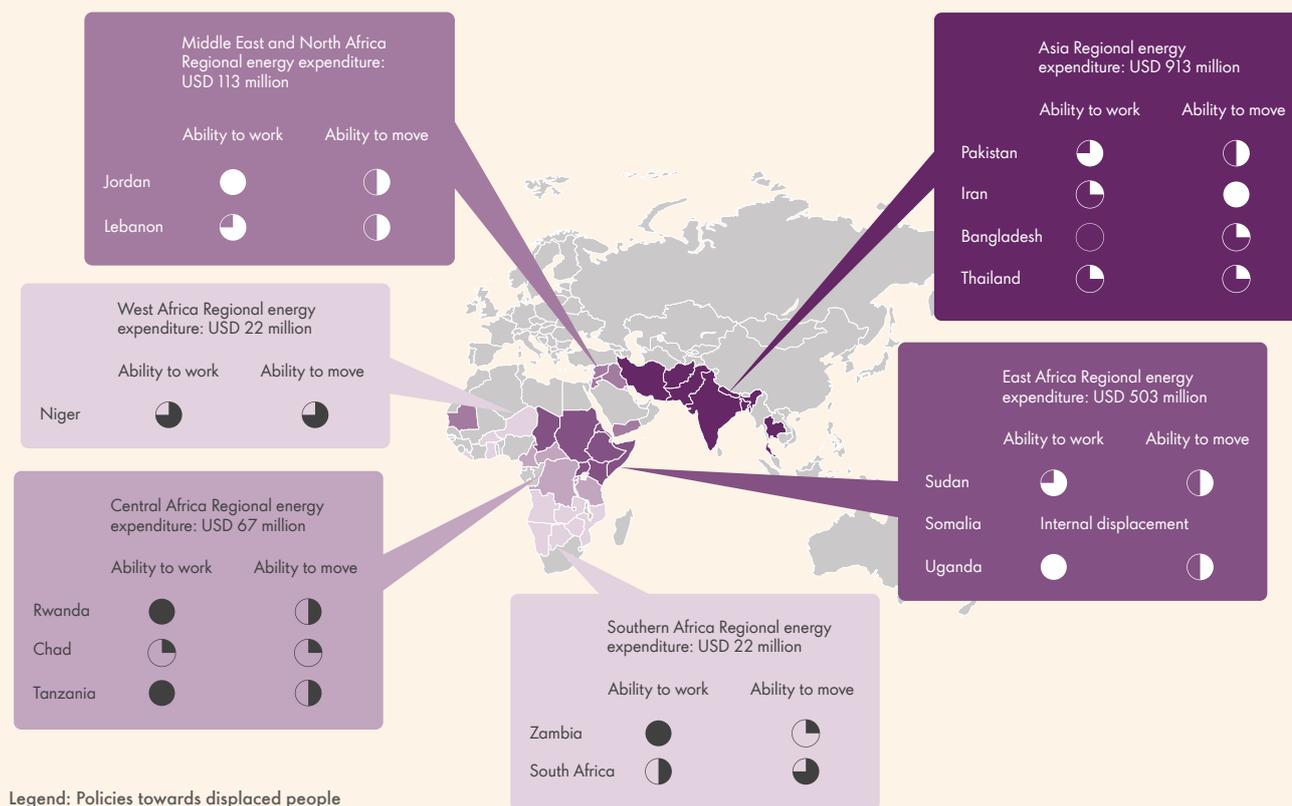
tend to have more favourable policy environments – six countries are currently signatories to the CRRF.⁸¹ Other African regions have relatively low levels of demand. This is due to smaller displaced populations and lower overall income levels in Central, South and West Africa. Even though the Middle East has a large population of displaced persons and higher income levels, it has relatively low levels of demand for off-grid energy due to its high grid electrification rates. The prevalence of off-grid solar products outside of displacement settings is also a crucial factor in determining the attractiveness of a location. The largest regional markets in terms of products sold in off-grid settings are East Africa and Asia, which is why they are important places for private sector involvement in energy provision in displaced settings.⁸²

⁸⁰ Comprehensive Refugee Response Framework, see section I.

⁸¹ Chad, Djibouti, Ethiopia, Kenya, Somalia and Uganda

⁸² Apart from demand and the enabling environment, supply-side factors also show great regional variation. The GOGLA semi-annual sales reports give a good indication of the existence of off-grid solar supply chains on a national level.

Figure 14: Distribution of current energy demand (expenditure) for off-grid energy (in displaced settings), and policy toward displaced persons in countries with the largest camp-based populations^{83,84}



Legend: Policies towards displaced people

Ability to work:

- Right to work is denied, even informally within camps
- ◐ Right to work is denied but informal work is possible in practice
- ◑ Right to work is granted but discrimination is common
- ◒ Right to work is granted by expensive permits are required
- Right to work is granted, no obvious restrictions

Ability to move:

- Strict encampment policy, movement outside camps is almost impossible
- ◐ Almost all DPs live in camps, movement outside camps is restricted arbitrarily
- ◑ Most DPs live in camps, movement outside is possible with permits or no encampment but IDs can be required arbitrarily
- ◒ No encampment, restrictions on settlement province or discrimination is common
- (Almost) no encampment, no province restrictions

Legend - regional level of demand

- > USD 900 million
- USD 500 to 900 million
- USD 100 to 500 million
- USD 30 to 100 million
- < USD 30 million

⁸³ The expenditure data is based on the expenditure model described in section II.B, while the policy data are based on KNOMAD, "Refugees' Right to Work and Access to Labor Markets - An Assessment", 2016 and UNHCR, "CRRF Two-Year Progress Assessment Report", 2018.

⁸⁴ Note that only self settled and planned camps as defined by the UNHCR are included in this analysis thus hosting countries which predominately host displaced

persons in individual accommodations are will be under-represented. This would include the majority of displaced person in the Americas, Europe and the Middle East.

➔ Were the energy demands across institutions, displaced and host community households, and businesses to be met, one can anticipate significant health improvements and positive social and economic impacts. The next section quantifies these potential effects.

D

The potential social and economic impact of improved energy access

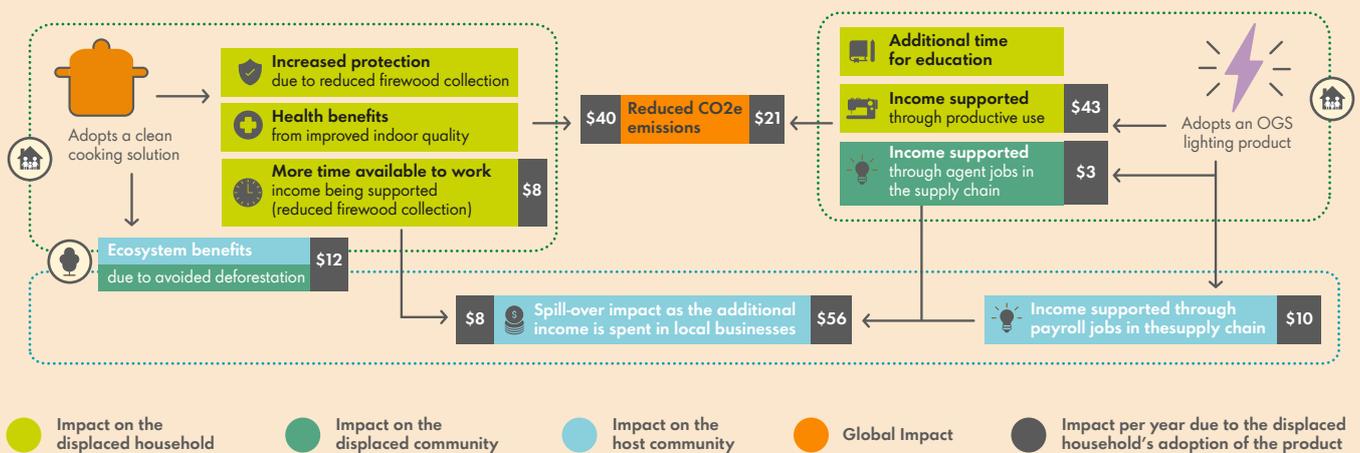
Access to energy can transform lives through more and higher-quality jobs, slowing environmental degradation and a broad range of social benefits. Energy access leads to job opportunities, a better living environment, more hours of light, access to communication, access to information, safer and cleaner cooking practices, increased productivity, better education, improved health, decreased gender-based violence, and overall improvements in the quality of life for people. These benefits are relevant for both displaced and their host communities, and are the reason why energy access is an investment in the future of refugee-hosting states.

- the households itself benefits by \$43 of additional income through increased working hours or productive use;
- in the wider displaced community, \$3 of income is supported through jobs in the off-grid solar supply chain;
- in the host community, \$66 of additional income is generated through payroll jobs in the supply chain for off-grid solar products and through knock-on impacts on the local economy (further described below);
- and, for the whole of society, around \$21 of environmental benefits are generated due to reductions in CO₂-equivalent emissions and avoided deforestation.

⁸⁵ Vivid Economics analysis.
⁸⁶ Health impacts are quantified in disability-adjusted life years (DALYs) but not monetised, and protection and education impacts are neither quantified nor monetised. This is the level of impacts per year from 2030.

A displaced household that buys an off-grid solar product creates, on average, the following impacts:⁸⁵

Figure 15: Impact generation pathway when a household in a displaced community adopts a clean cooking or OGS lighting product⁸⁶





⁸⁷ The Multi-Tier Framework (MTF), developed by ESMAP, represents an effort to build global, aggregable metrics and a database for evaluating electricity access in a non-binary fashion, measuring the quality of access rather than merely access to any source of electricity. The MTF redefines energy access to a multi-dimensional definition as “the ability to avail energy that is adequate, available when needed, reliable, of good quality, convenient, affordable, legal, healthy and safe for all required energy services.” That is, having an electricity connection does not necessarily imply having access to electricity under the new definition, which takes into account additional aspects, such as reliability and affordability. Energy access is measured on a tiered spectrum, from Tier 0 (no access) to Tier 5 (the highest level of access). ESMAP (2015), *Beyond Connections: Energy Access Redefined*.

⁸⁸ These represent benefits in Figure 23, scaled up to the entire displaced population.

⁸⁹ Benefits amount to USD 653-1,671 million if incremental expenditure for displaced persons between 2018 and 2030 is between USD 377-1,208 million.

⁹⁰ The range represents the lower and upper bounds (63% of USD 653, and 73% of USD 1,671).

⁹¹ Some jobs in the OGS supply chain go to host community households, and they benefit from the additional spend in the local economy.

The total value of annual social and economic benefits of providing access to lighting and cooking to displaced persons (assuming the highest Tier of solutions that they can afford), ranges between \$653 million and \$1,671 million. At this level of expenditure (\$650 – \$1,500 million, as discussed in section II.A), a large proportion of the displaced population has Tier 0 or Tier 1 (less than 4 hours) access to electricity per day and a third of the population is using modern fuels for cooking while a small proportion of the population, around 3%, still has no access to lighting.⁸⁷ The benefits of lighting and cooking for displaced people and host communities, assuming at the lower bound of impacts⁸⁸, are presented in Figure 16.

The estimated benefits of access to energy outweigh the expenditure on energy.⁸⁹ For every dollar spent on energy annually, \$1.4-1.7 in benefits can be achieved. For every \$1 spent by displaced persons on energy, \$0.6 in benefits accrue to the host community,

\$0.4–0.5 to the displaced community itself, and \$0.4-0.6 to global society. This does not imply that the benefit-to-expenditure ratio for displaced persons themselves is less than one, as many impacts which accrue directly to displaced households (such as health, protection and education outcomes), as discussed below, are not included in this calculation.

Income generation through additional jobs, increased productivity and working hours is the biggest source of benefits (63 to 74% of total, or \$411 to \$1,233 million per year).⁹⁰ The additional jobs are created in the energy supply chain (such as lantern sales and service) and through the use of energy appliances to generate income (like solar-powered phone-charging or refrigeration services).⁹¹ This additional income from jobs is typically spent in and around camps, creating more local economic activity. Overall, annual incomes for displaced persons could increase by 7 to 10% per household (an increase of \$46-75 per year) and between 1 and 2% per host community household (an increase of \$50-107 per year).

The benefits of access to energy outweigh the expenditure on energy. For every dollar spent on energy annually, \$1.4-1.7 in benefits can be achieved.

Time savings due to reduced time spent collecting firewood and cooking (as a result of more efficient cooking solutions) could represent an additional income worth \$25-61 million.

⁹² Jobs in the supply chain for off-grid solar products could displace jobs in the supply chain for traditional fuels, for instance kerosene sellers (data for which is scarce). For this reason, the figure presented here is an overestimate of the income created.

⁹³ An estimated 20 minutes per day could be saved. Not all displaced persons will be able to spend this additional time in income-generating activities due to the limited availability of paid jobs – we assume that 20% of this time can be used for income generation. Based on employment rates in Rwandan and Ugandan camps, calculated based on HEED, Surveys in Gihembe, Kigeme, Nyabiheke, Rwanda 2018, Dalberg, Business Surveys in Bidi Bidi settlement, Uganda 2020

⁹⁴ Vivid Economics analysis.

⁹⁵ Here, a decrease in the occurrence of respiratory diseases is the main cause for the improvement in health outcomes.

⁹⁶ This is an upper bound estimate, as it assumes a complete shift to LPG stoves, which would be used 100% of the time.

⁹⁷ Global Alliance for Clean Cookstoves, "Statistical Snapshot: Access to Improved Cookstoves and Fuels and its Impact on Women's Safety in Crises", 2014

⁹⁸ UNHCR, "Evaluation of the Dadaab Firewood Project, Kenya", 2001

⁹⁹ Mills, "Identifying and reducing the health and safety impacts of fuel-based lighting", 2015

- Additional income is generated from extended working hours, increased productivity and new jobs supported by the use of energy products for income generation. This income will total between \$140-456 million annually and will be supported by an equivalent of 172,000-540,000 full-time jobs.

- Income is also supported by job creation in the supply chains for off-grid solar products. This accounts for \$42-103 million and will be supported by 36,000-95,000 jobs, of which a third would be in the displaced community. These would be commission-based jobs. The other two-thirds of new jobs would be available for the host community.⁹²

- Time savings due to reduced time spent collecting firewood and cooking (as a result of more efficient cooking solutions) could represent an additional income worth \$25-61 million.⁹³

- This additional income is typically spent in and around camps, creating more local economic activity leading to an additional benefit of \$204-613 million. However, these broader economic spill-over effects are only possible if displaced and host communities are able to work, move, and interact with the host community.

The environmental benefits of energy access – through avoided deforestation and avoided carbon emissions – could be as high as \$242-434 million per year (26 to 37% of total benefits).⁹⁴

- As energy consumers move from firewood to more efficient and cleaner-burning stoves and fuels, many negative environmental consequences of

deforestation can be avoided locally. Also, larger climate benefits accrue from the preservation of carbon-trapping forests and a reduction in the use of polluting fuels like charcoal.

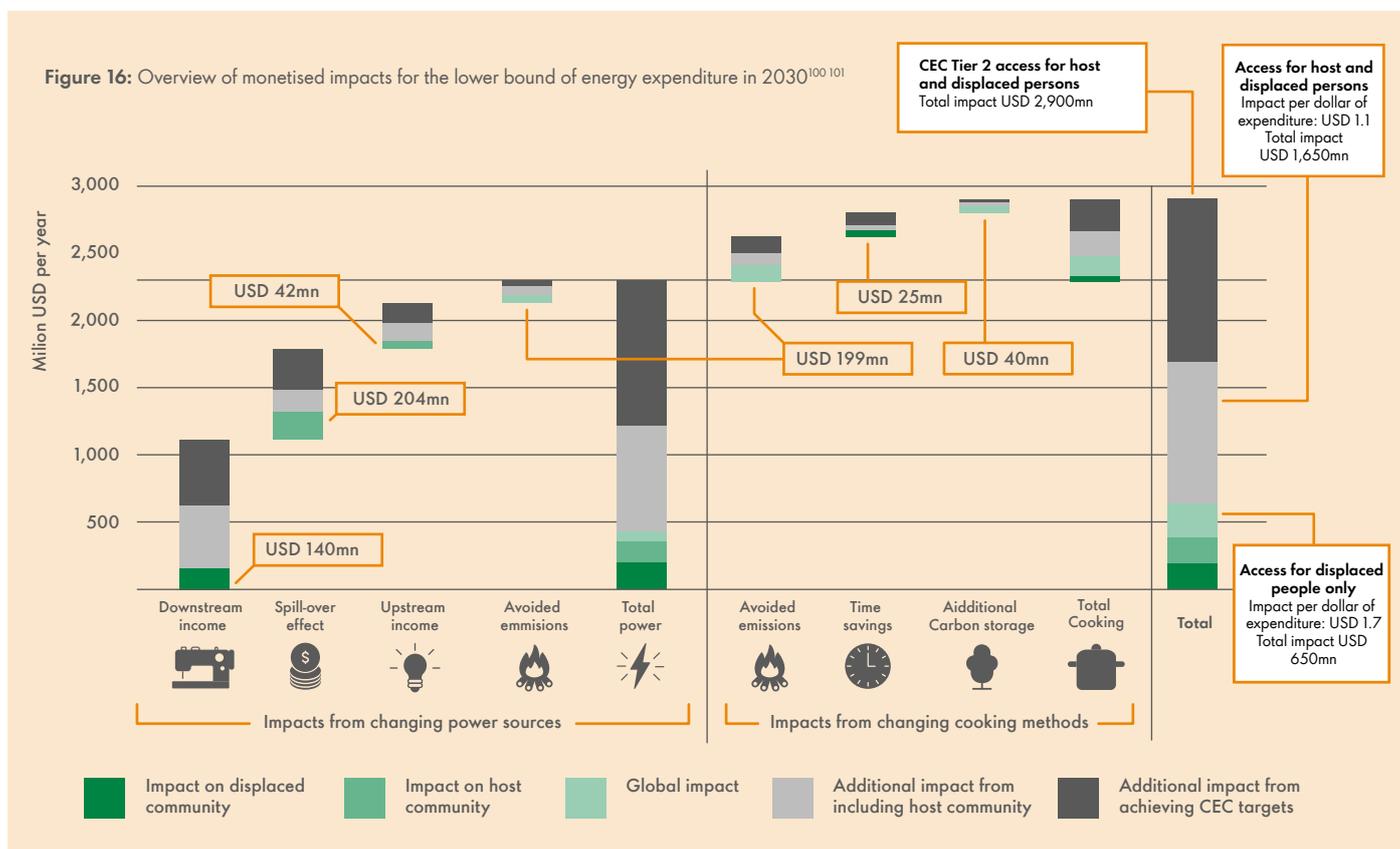
Additional social benefits, particularly related to health, protection, and education, may also be large.

- Health benefits are quantified using Disability-Adjusted Life-Years (DALYs), which represent a year of healthy life lost due to disease or disability. A switch to cleaner cooking reduces indoor air pollution, leading to improved health outcomes⁹⁵ equivalent to 168,000 DALYs. The use of LPG stoves by displaced persons could reduce emissions from cooking by around 40%.⁹⁶

- Increased protection for women and girls results from less time spent collecting firewood and improved lighting in communal areas of camps.⁹⁷ An evaluation of the Dadaab firewood project in Kenya found that during the period when households were fully equipped with firewood, violence against women decreased by 45.2%.⁹⁸

- Fires, burns and kerosene poisonings should also become less frequent as safer sources of energy become widespread.⁹⁹

- Education can improve as better lighting can enable children to spend more time studying.



¹⁰⁰ Jobs in the supply chain for off-grid solar products could displace jobs in the supply chain for traditional fuels, for instance kerosene sellers (data for which is scarce). For this reason, the figure presented here is an overestimate of the income created.

¹⁰¹ Health impacts are quantified in disability-adjusted life years (DALYs) but not monetised, and wider social impacts are neither quantified nor monetised. Impact figures represent annual totals in 2030 either under the lower bound of estimated energy expenditure (see section II.B) or under conditions in which the Clean Energy Challenge has been met. Expenditure under the Clean Energy Challenge is not calculated – expenditure was calculated using a top down approach (share of income) for the projected values, and calculation of expenditure for CEC requires a bottom up approach (to cost the technologies that need to be adopted to reach Tier 2 level of access). Institutional savings are not included here.

¹⁰² In this case, the total impacts could be up to USD 1.6 – 3.7 billion.

¹⁰³ Under this scenario, all displaced persons and host communities are provided with Tier 2 access for electricity and modern cooking fuel (see section II.A on the CEC).

Benefits from clean cooking solutions are not immediate and do not accrue directly to the household, unlike those from lighting and power. Apart from benefits through time saved on collecting firewood and cooking, which do not necessarily turn into additional income considering limited employment opportunities (see Figure 16), most benefits from cleaner stoves are not immediately noticeable for the user. While clean cookstoves are much better for the environment and cause significant health improvements, these effects are not immediate or tangible. This could explain the lower willingness to pay for clean cooking solutions in the displaced community (see section II.B). Improved employment opportunities through

livelihood programmes, and increased awareness of longer-term health benefits could help increase the willingness to pay.

Institutions could also save on diesel costs as they switch to solar mini-grids and solar home systems. These benefits, between \$43-77 million per year, are relatively small compared to other benefits.

Two factors could multiply the total benefits outlined above by four times to as much as \$2.9–5.4 billion annually. First, if the new market for displaced persons includes the host community.¹⁰² Second, if the world is able to meet the Clean Energy Challenge by serving 100% of displaced persons with Tier 2 (4-8 hours electricity/day) lighting and modern cooking fuels.¹⁰³ If



both happen, the overall impact could be as much as \$2.9 – 5.4 billion per year, as shown on Figure 16 for the upper bound. However, meeting the Clean Energy Challenge is a highly ambitious scenario and would require significant support from governments, humanitarian organisations, and development agencies – as affordability will remain a constraint under even the most optimistic policy support scenario. This may be even more challenging in the current economic downturn as government and aid agency budgets may be slashed.

Aid agencies and governments need the private sector if they want to achieve quick and large-scale access to energy for people who live in and around camps.

The private sector plays an essential role in unlocking these economic and social benefits for people who live in and around camps, governments and aid agencies. Aid agencies and governments need the private sector if they want to achieve quick and largescale access to energy for people who live in and around camps – and unlock the socio-economic impacts discussed earlier. Both host governments and aid agencies will reap a large share of these benefits. Host governments will benefit from a positive effect on their local and regional economies, which represent 36 to 39% of impacts, or \$235 to \$687 million. Aid agencies will benefit from more jobs for displaced communities, which can ease the strain on agency resources, representing \$175 to \$546 million, or 27 to 31% of impacts. Governments and agencies also have an interest in improved environmental outcomes, which range from \$283 to \$434 million, or 25 to 37% of total impacts.

→ Section III below discusses ways for private companies and investors to unlock the benefits outlined above, as well as the actions aid agencies and host governments can take to support this.

Obstacles and opportunities



Above, it was laid out that the private sector is necessary to meet long-term energy needs in camps and settlements and how this would benefit everyone involved. There are even some characteristics of camps and settlements that could enable the private sector in its efforts to provide access to energy.

I Institutional support: Most camps are managed by humanitarian institutions and therefore have infrastructure like roads, schools, and health clinics. In the Bidi Bidi settlement, 20% of displaced person households reported a streetlight installed near their house, compared to 1% of the host communities. The private sector can also build on energy initiatives that might already exist in camps.

II Scale: Aid and development organizations manage many camps and settlements. This offers the opportunity for large-scale agreements encompassing a region or an entire country.

III High density: In camps, households form densely populated communities. For companies, this means there are is a customer base and an opportunity to hire staff that understands the needs of this population. The heterogeneity of camps and settlements also ensures a diverse energy demand, requiring different products to offer choice.

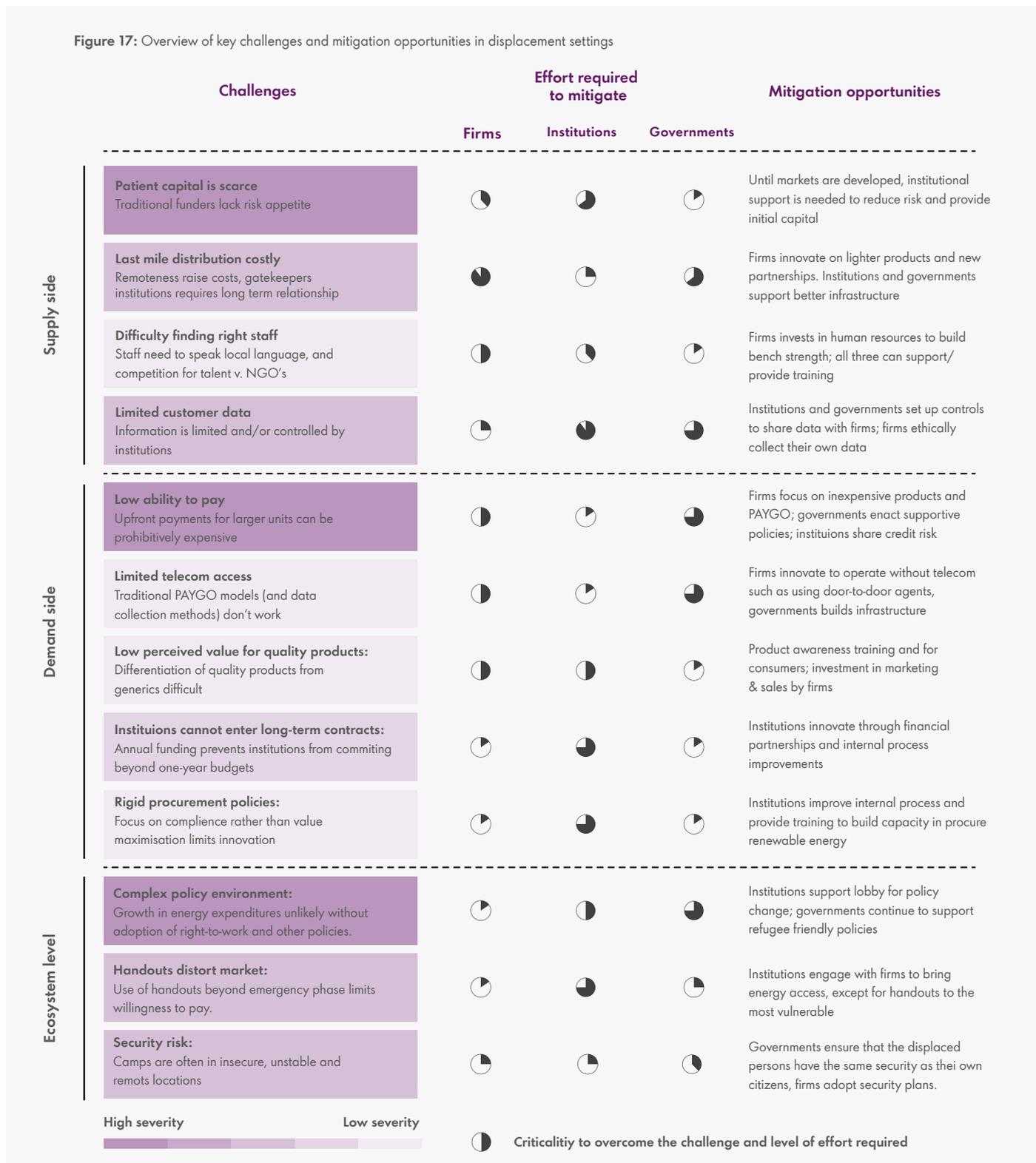
Overcoming challenges calls for innovation and collaboration across institutions, governments, and the private sector.

IV Long-term planning : Camps and settlements are meant to be temporary – however, they increasingly house people for a long time. This has necessitated market-based approaches that allow humanitarian aid organizations to cater to long-term needs efficiently.

Including the private sector in providing energy access in displacement will nevertheless require off-grid energy companies to overcome many challenges – some of them are similar to other rural off-grid energy settings. The illustration below discusses how these obstacles can be addressed. Most of them call for innovation and collaboration across institutions, governments, and the private sector.

¹⁰⁴ Turner, Simon; "What is a refugee camp? Exploration of the limits and effects of the Camp", 2016

Figure 17: Overview of key challenges and mitigation opportunities in displacement settings



Removing these obstacles requires collaboration across energy investors and enterprises, humanitarian and development organizations and host governments.

It also requires a fundamental willingness to change the traditional way of working in three ways:

A. Shared goals, instead of competing priorities. Providing affordable, reliable, cleaner energy for displaced persons, host communities, and the institutions that serve them benefits everyone involved.

B. A long, instead of a short-term perspective. Acknowledging that there is likely to be long-term demand makes investments easier.

C. Planned, instead of ad hoc efforts. Success requires a delicate balance of policy and projects and a shift from an approach that is based on hand-outs and in-kind support to an approach that provides choices and self-reliance to people by giving aid in cash and setting up energy markets in and around camps.

→ Section IV below shows ways for energy companies, institutions and host governments to support access to energy in and around camps and settlements.



Working together to achieve more:

A call for collaboration

A

Energy companies

Early entrants into energy in displacement have the opportunity to innovate on their business models to address the specific barriers and enablers addressed above. While each camp and settlement is unique and requires a slightly different approach, the below explores three key questions for energy enterprises to consider: how to work with organizations managing camps, which technologies to deploy, and how to mitigate financial risks. A summary of ideas how to start getting involved is detailed below – showing individual action that can start immediately as well as longer-term engagement that will require deep collaboration between actors.

i. How can energy companies work effectively with organisations managing camps?

In the short term:

1 Collaborate with institutions to better understand the needs in displacement settings: NGOs and aid agencies work closely with displaced persons and have unique insights. They can also help identify community influencers and key stakeholders or groups who can help create awareness and encourage others to switch to cleaner, more reliable energy sources. Sometimes, individuals might be

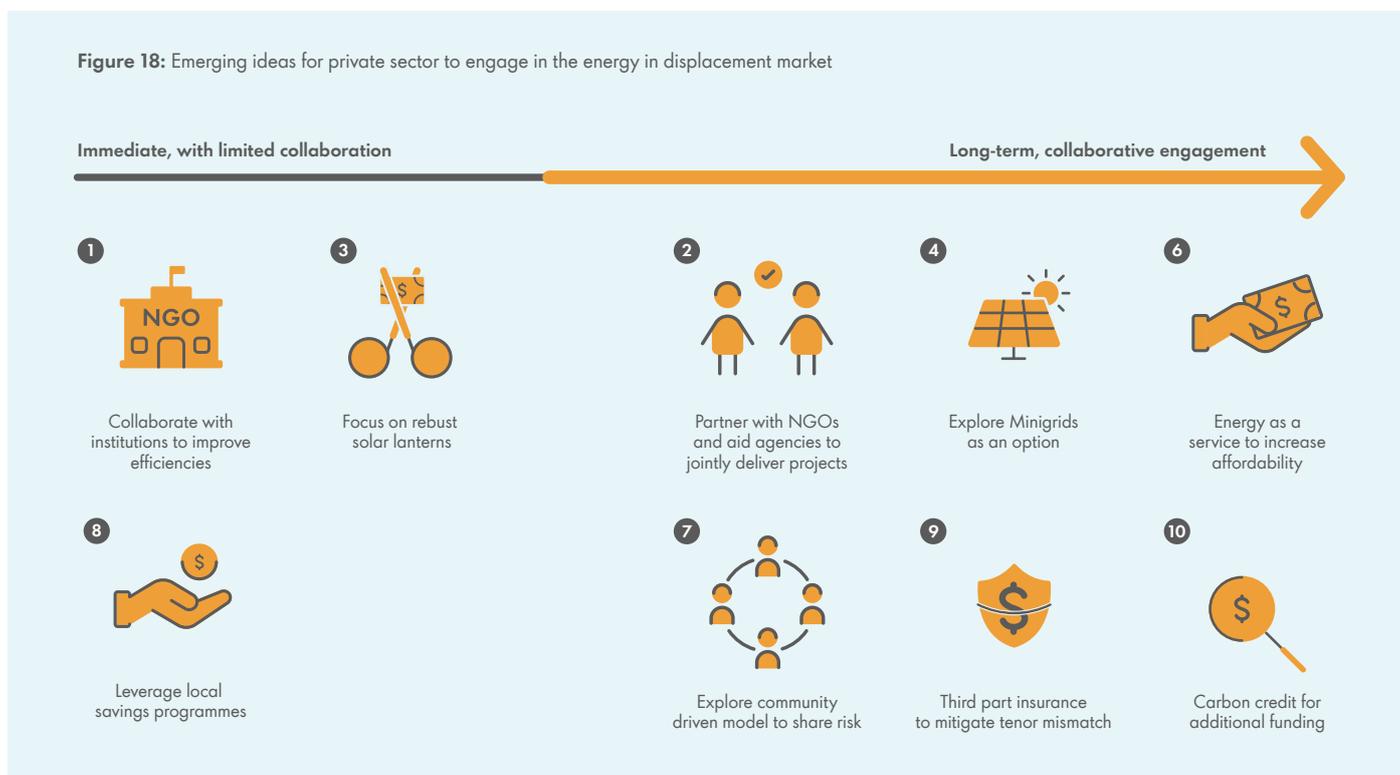
...each camp and settlement is unique and requires a slightly different approach...

reluctant to switch from systems they have used for long periods of time, and might need members of their own community to help see the value of alternative energy options. Further, they can provide advice on navigating cultural and social challenges when operating within the camp and help build an understanding of the levels of vulnerability and support requirements. In the longer term:

In the longer term:

2 Partner with NGOs and aid agencies to aggregate energy demand for improved efficiency of supply: NGOs and aid agencies can work with energy companies to enter into agreements that meet the demand of multiple camps in a region, for example, allowing them to use scale to deliver energy efficiently and at lower cost. To ensure efficiency, energy companies can use aid agencies as anchor clients to test energy delivery models before attempting to provide energy to households within camps.

Figure 18: Emerging ideas for private sector to engage in the energy in displacement market



ii. Which technologies are most suited to displacement settings?

In the short term

3 Explore robust, higher quality solar lanterns at more affordable prices: Many displaced households desire to return to their country of origin and prefer small, portable products they can take with them if they do. Forty percent of displaced persons in Bidi Bidi settlement rated portability as one of their top-three considerations when making an energy

¹⁰⁵ Dalberg, *Business Surveys in Bidi Bidi settlement, Uganda 2020*

¹⁰⁶ Imperial College London, *Sustainable mini-grids systems in refugee camps: A case study in Rwanda, March 2020*

¹⁰⁷ KoKo Networks, *Ethanol Fuel Supply chain overview, 2018*

purchase.¹⁰⁵ Furthermore, due to limited budgets and a lack of credit, displaced persons often buy multiple products over time rather than save for a larger system.

In the longer term

4 Continue to test mini-grids for displacement settings: Because of the high population density and the availability of anchor clients as well as general humanitarian support within camps and settlements, mini-grids are more viable in displacement settings than in ordinary rural low-income areas. Solar mini-grids can replace diesel generators run by institutions, reducing greenhouse gases, with a payback period between 1 – 6 years.¹⁰⁶ Pilots testing the commercial viability of using this energy delivery model – using humanitarian

organisations and the institutions they support as anchor clients – should be further explored with a view to generating models that lend themselves to scale.

5 Consider pay-per-use models for cooking to increase affordability: The model allows users to make frequent, small purchases based on the amount of energy consumed. For example, in Kenya, KoKo Networks provides ethanol fuel in small quantities using automatic dispensing machines which have been widely installed in shops throughout the city.¹⁰⁷ This makes it possible for people with very low incomes to purchase small amounts. While such models require greater upfront investment to set up the required networks of dispensing machines, they can help mitigate affordability challenges.

iii. How can companies mitigate financial risks?

In the short term

6 Leverage local savings programmes to boost savings and the availability of consumer finance: Village saving and loans associations (VSLAs) are used by some households in displacement settings to collectively save for

...repayment rates of refugee entrepreneurs were greater than 96%...

larger purchases and manage risk. Commercial banks near Bidi Bidi settlement have begun to provide bank accounts for such associations run by displaced persons, with plans to use the strong social bonds between the members of the association to manage credit risk.¹⁰⁸ As they can be adopted for purchasing energy products, camps and settlements that feature these associations may increase the success of giving energy choices to their inhabitants.

7 Continue to test viability of PAYGO in displacement: There have been several trials of the PAYGO¹⁰⁹ model in and around camps and settlements, with a focus on lower priced products and with some adaptations. For example, Village Power, through a partnership with Mercy Corps, has been selling solar home systems in the Bidi Bidi settlement through a PAYGO model that allows customers with limited mobile banking access to pay through physical agents.¹¹⁰ While it may be too early to form views of the credit risk from these trials, research by the Refugee Investment Network showed that the repayment rates of refugee entrepreneurs were greater than 96% and comparable with the repayment rates of host country entrepreneurs.¹¹¹ This suggests that PAYGO has the potential to work in displacement settings.

8 Explore models to share risks: Co-ownership of energy assets offers a unique way to limit risk for investment. Power Trust Africa (PTA), an off-grid solar company, sold solar business hubs (containers with solar panels and preinstalled appliances relevant to the business) to refugee-run business associations in the Bidi Bidi settlement. PTA provides loans, structured such that

a portion of the profits from running the business goes towards loan repayment. This limits the risk for the business associations, as a portion of the loan repayment is variable. It also allows PTA to share in the business' success by getting repaid earlier if the business is successful.

In the longer term

9 Use guarantees to overcome financial mismatches: Most humanitarian agencies operate on annual budgets. This means they cannot make long-term commitments, because it is not sure how much funding they will have in the future – which makes it hard for companies to make viable offers on how to serve energy needs. Institutions also cannot obtain financing from commercial banks for capital expenditures. Third party insurances or guarantees to manage this mismatch would allow for greater success of commercial funding.

10 Carbon credits for additional funding: The sale of carbon credits to support a transition to low-carbon energy can provide new sources of funding for climate friendly projects. While tracking, verifying and selling carbon credits is an administrative burden for small companies, the additional funding from successful implementation can be an important source of funding where financing is already limited.¹¹²

¹⁰⁸ Stakeholder interview

¹⁰⁹ Under a Pay-as-you-go ('PAYGO') model, the company selling the product provides the consumer financing to purchase the product. In most cases, the purchaser pays a deposit, usually 10 - 20%, and then repays the loan over a period of several months to a few years.

¹¹⁰ Stakeholder interviews

¹¹¹ Refugee investment network, "Paradigm Shift", 2018

¹¹² Project Gaia, Clean burning ethanol stoves

Financing energy in displacement settings

Energy companies operating in and around camps and settlements need specialised funders to provide patient capital. Displacement settings are complex and unpredictable. Traditional funding approaches, even those adapted to the general energy access world, will not support the risk/return characteristics of this market, especially during the introduction stage when risks are highest. Funders need to take into account the extreme vulnerability and limited financial inclusion of displaced people so that business models can make products accessible to all.

Further funding will be required to conduct pilots, complete R&D and support working capital needs. Several financial mechanisms, such as results-based and blended financing, are starting to be tested to improve private sector engagement. However, these approaches have not been implemented at scale. Firms are still experimenting to find business models that serve energy needs in displacement settings without subsidies. Transparency and sharing of lessons learned will be important to build a broader evidence base that would give funders and companies more confidence to enter the market.

Risks in camps remain too high for traditional investors, so commercial activity continues to be largely supported by grants. Virtually all funding for energy in displacement to date has come through the re-investment of operating cash or grants to de-risk the investments. For example, The Moving Energy Initiative provided a grant to the solar energy company BBOXX, to run a pilot in Kenya's Kakuma camp. The grant covered the cost of the first 75 PAYGO SHS units sold, rent, staff, training, and part of the marketing for six months. More recently, USAID through the Smart Communities Coalition, awarded three grants worth a total of \$465,000 to de-risk pay-as-you-go solar home systems in Uganda Refugee settlements.¹¹³

Some level of subsidy may always be required to set up energy markets in and around camps and settlements. Subsidies could have more impact if existing

donor and investor funding are redirected from ad-hoc, bulk purchased products to developing long-term energy markets that deliver affordable, clean, reliable energy. This is especially important in current times, when priorities around the COVID-19 response are likely to push back the attention for energy-related efforts in humanitarian settings.

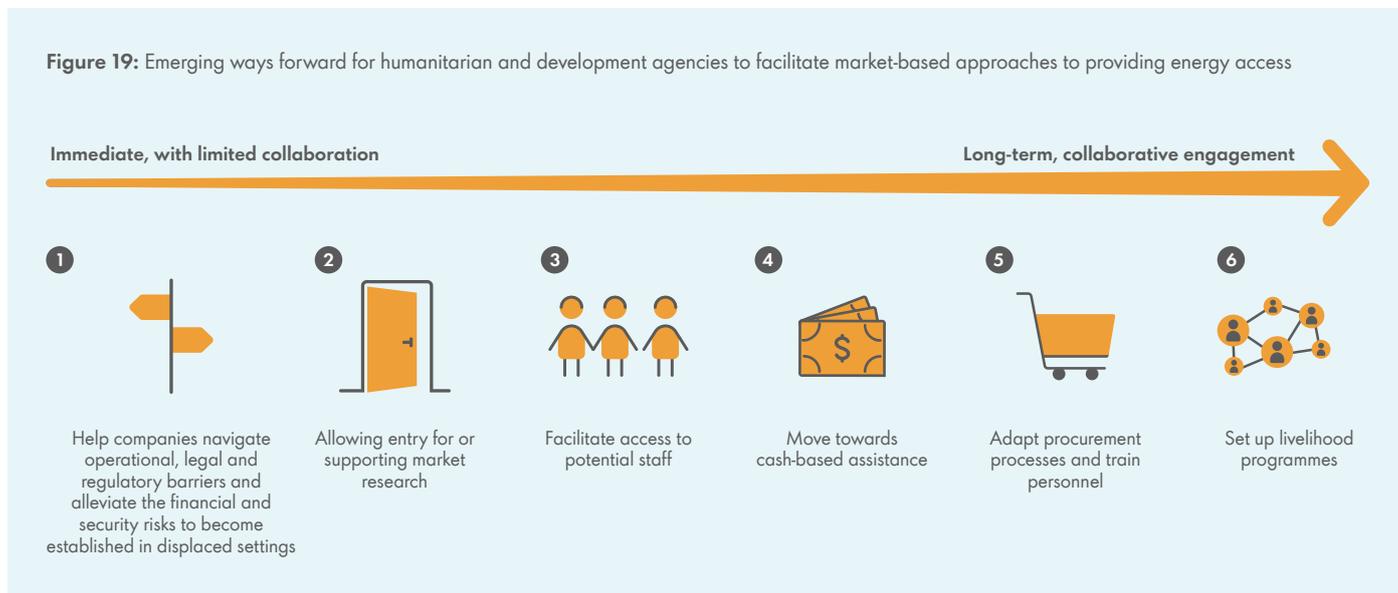
Although more commercial funding is still absent, interest is rising. Investment intermediaries such as the Refugee Investment Network have created frameworks for investment in displacement settings. Meanwhile, impact investors such as Development World Markets are in the process of launching new funds aimed at supporting firms working with displacement communities.¹¹⁴ Such developments point to increased interest in the displacement space as an impact-driven funding opportunity.

Institutional support and impact investments will be key enablers of private sector participation in displacement settings. Given that traditional funders are unlikely to make investments except under purely commercial terms, inclined funders are likely to either focus on non-financial returns and impacts or reduce risks through guarantees, co-investment or subsidies. This is similar to how comparable markets developed. The off-grid solar market, for example, has benefited from grants and equity investments made by foundations and development financial institutions, that have the mandate and capacity to absorb losses for the purpose of advancing the market.

We are trying to open the market and understand that it is risky. We are trying to find players who can help manage that first loss.

Equity Bank

Figure 19: Emerging ways forward for humanitarian and development agencies to facilitate market-based approaches to providing energy access



B

Humanitarian and development organisations

¹¹³ USAID, *Power Africa announces grant winners to improve energy access in Uganda refugee settlements*, May 31, 2019

¹¹⁴ *Developing world markets is in the midst of creating a new Global Displacement fund which would make equity investments in refugee and migrant inclusive businesses. The fund will target financial institutions that already have businesses that expose them to refugees (but may not have specifically targeted displaced people in the past). The fund will seek both social and financial returns and is expected to provide near-market rate returns.*

¹¹⁵ UNITAR, *“Electricity For Un Agencies In Humanitarian Settings: Advancing Sustainable Energy Solutions And Minimising The Use Of Diesel. Workshop series report. Prepared by Paul Quigley for Workshop I, held with UN Agencies and ICRC on 2 July 2019, and Workshop II with private sector energy and finance organisations on 16 July 2019”, 2019*

Humanitarian and development organisations are increasingly including the private sector in their plans to reduce costs and make their operations more sustainable, and can play a key role in de-risking private sector engagement. There is a recognition, for example, that shared, centralised electricity supplies could address the needs of multiple organisations and potentially reduce costs through economies of scale.¹¹⁵ However, most humanitarian organisations have not traditionally prioritised access to clean and modern energy solutions, and therefore lack staff with the requisite skills and knowledge to successfully design, install, and operate such energy systems. As a result, they are increasingly willing to collaborate and co-develop standardised, longer-term agreements with private sector players. Figure 19 sets out three near-term steps and three long-term opportunities for humanitarian and development agencies to enable responsible private sector involvement in supplying sustainable energy to displaced and host communities.

In the short term

- 1 Help companies navigate operational, legal, and regulatory barriers and reduce financial and security risks:** Humanitarian organisations have expertise that is crucial for companies seeking to operate in and support displaced settings. Specifically, they maintain relationships with key government officials, understand how to navigate regulatory obstacles, and have experience in transporting people and goods into camps, which these companies may lack in these specific settings. In addition, humanitarian agencies could provide access to their existing distribution and storage networks to help companies manage logistics costs.
- 2 Allowing entry for or supporting market research:** Humanitarian agencies arguably know the needs of displaced persons best and can therefore help companies to assess the demand and ability and willingness to pay. This information is crucial, because

Cash-based assistance helps local businesses, shops, and tradespeople, which improves the relationship between displaced populations and hosts communities.

¹¹⁶ Concerns about cash-based assistance also remain, for instance around how cash-based assistance affects the intra-household distribution of resources and the possible misuse of cash for purposes seen as inessential – for instance, to buy alcohol. Further, if local marketplaces can't absorb the influx of cash, it could cause inflation.

¹¹⁷ Syrian refugees in Jordan, for instance, can collect cash assistance from local ATMs using an iris scan technology. Similarly, UNICEF's Alternative Response for Communities in Crisis (ARCC) initiative in the Democratic Republic of the Congo has demonstrated how flexible cash grants can promote resilience and recovery in highly complex displacement situations. UNHCR, "Policy on cash-based interventions", 2016; CaLP, CTP and Accenture, "The state of the world's cash – Cash transfer programming in the humanitarian world", 2018.

¹¹⁸ It is crucial that cash-based assistance, which are essentially demand-side subsidies, are not used to address the (many) supply side constraints, but rather to address low affordability. Even then, they should have a sustainable exit pathway to ensure creation of a sustainable market.

¹¹⁹ See for instance CaLP, CTP and Accenture, "The state of the world's cash – Cash transfer programming in the humanitarian world", 2018

¹²⁰ UNITAR, "Electricity For Un Agencies In Humanitarian Settings: Advancing Sustainable Energy Solutions And Minimising The Use Of Diesel. Workshop series report. Prepared by Paul Quigley for Workshop I, held with UN Agencies and ICRC on 2 July 2019, and Workshop II with private sector energy and finance organisations on 16 July 2019", 2019

¹²¹ UHumanitarian Policy Group, *Livelihoods in Displacement – from refugee perspective to aid agency response*, September 2017

displaced communities are difficult to access for market research and consist of a dynamic population with changing composition and expectations. Without support of an agency, companies would go in blind, which would greatly reduce their ability to tailor their product to the needs of vulnerable displaced persons.

3 Facilitate access to potential staff: Currently, off-grid energy enterprises compete with institutions for staff and face challenges finding and hiring staff from within the displaced person community (for jobs in the energy-product supply chains relating to sales). Humanitarian agencies could coordinate hiring processes across agencies and include companies in this process. Having access to (skilled) staff would greatly enhance companies' ability to reach their potential customers, especially within the displaced community.

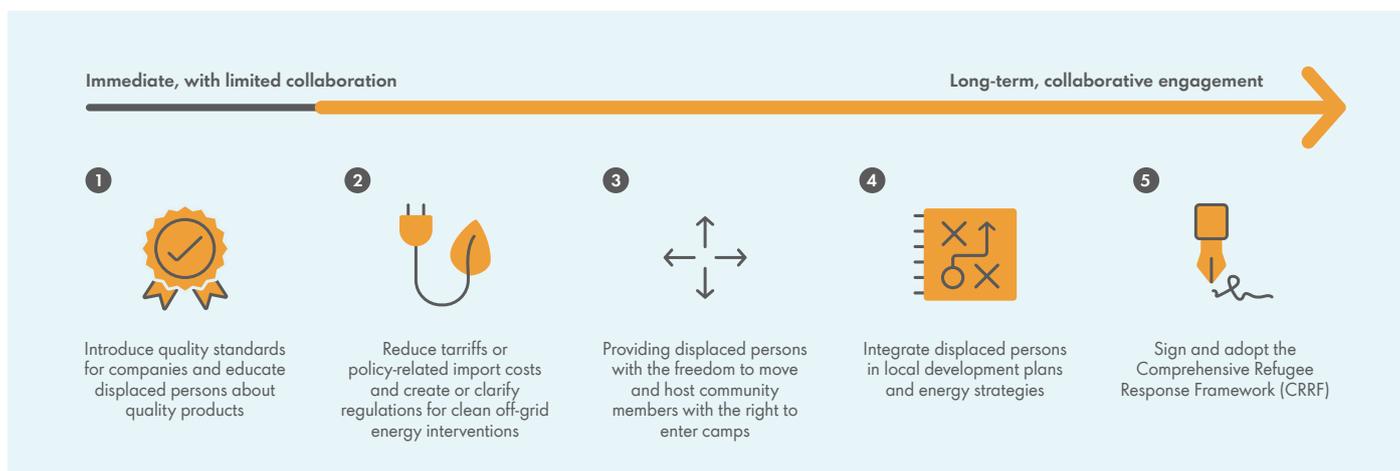
4 Move towards cash-based assistance: Across the humanitarian community, there is a trend towards providing cash-based assistance instead of aid in-kind.¹¹⁶ All major humanitarian organisations support cash-based assistance as a matter of principle, although implementation depends on local conditions. Cash-based assistance is particularly well-suited to support displaced persons who live in urban areas outside of camps, as such areas host the highest density of shops and markets.¹¹⁷ Apart from possible inflation, the advantages of aid-in-cash are abundant. Cash enables choice, providing displaced persons with greater purchasing power, which makes it possible for companies to provide access to energy.¹¹⁸ Cash also reduces the logistical imposition on humanitarian organisations and supports local economies. Humanitarian

handouts are often produced and purchased abroad while cash-based assistance helps local businesses, shops, and tradespeople.¹¹⁹ This in turn improves the relationship between displaced populations and hosts communities.

In the longer term

5 Adapt procurement and contracting processes: As humanitarian agencies are beginning to make their operations more environmentally sustainable, they are increasingly finding out they do not have the skills and expertise to evaluate life-cycle costs for technically and financially complex energy solutions. As a result, most agencies recognise the need to engage or partner with firms that have greater experience and expertise. Contracts should be carefully designed to incentivise efficiency and sustainability while ensuring that humanitarian aims are met. These contracts could be backed up by de-risking instruments that can enable private energy providers to recover outstanding investment costs if termination clauses in energy-service agreements are triggered.¹²⁰

6 Enable people to earn their own income: In addition to cash-based assistance, agencies can put a bigger emphasis on promoting entrepreneurship. This will improve the ability of displaced persons to pay for energy services. Autonomy through work is an important priority for households and is in line with the ambition to achieve greater self-reliance proclaimed by the Global Compact on Refugees. Institutions have a particularly important role to play in this given that the direction of humanitarian aid determines a displaced persons' options and decisions.¹²¹



C

Host governments

To support access to sustainable energy that benefits both displaced and host communities, governments should remove obstacles that hinder investment from private companies.

In many cases, host communities have limited access to power, similar to the camps and settlements they surround. Already, a substantial portion of energy products aimed at camps and settlements is in fact sold to the host community. This suggests that private sector would and should address displaced and host communities jointly, as it will provide them opportunities of scale. Figure 20 sets out one immediate and four long-term opportunities for host governments to build an enabling environment for private sector engagement in displacement settings, all of which are further explained below.

In the short term

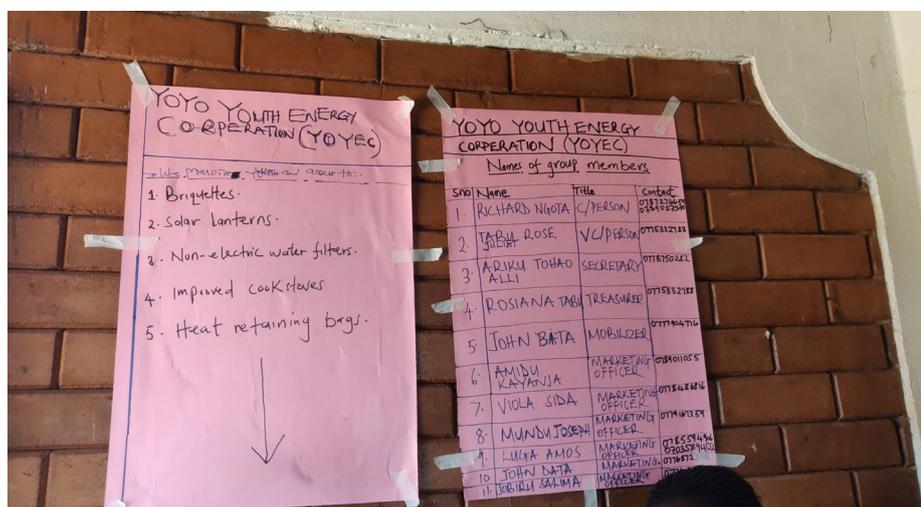
1 Introduce internationally accepted quality standards and inform displaced persons about quality products. Strong consumer protection mechanisms are necessary to build trust and limit the exposure of vulnerable people to inferior products,

fraudulent or insufficient after-sales support, and physical and financial risks. An increasing number of governments are adopting internationally recognised quality standards and testing procedures as part of their regulations, with the International Electrotechnical Commission (IEC)/Lighting Global Quality Standards leading the way.¹²² However, for quality standards to be effective, they must be enforced and appropriate sanctions for violation must be in place. Also, many unregulated products are cheaper, which makes consumers reluctant to pay 'extra' for quality-verified products. This means governments play a role in protecting vulnerable consumers by providing information about the quality of products.¹²³

Already, a substantial portion of energy products aimed at camps and settlements is in fact sold to the host community.

¹²² Lighting Global, ESMAP and GOGLA, "Off-Grid Solar Market Trends Report 2020", 2020. IEC is a leading global organization that publishes consensus-based International Standards for electric and electronic products, systems and services, collectively known as electrotechnology. IEC has adopted the Lighting Global testing methods as Technical Specification 62257-9-5.

¹²³ Lighting Global, ESMAP and GOGLA, "Off-Grid Solar Market Trends Report 2020", 2020



...it is important to balance the opportunities that freedom of movement present and the need to protect a vulnerable community.

In the longer term

2 Simplify and update tariff regimes and create or clarify regulations for clean off-grid energy interventions. In general, most markets where off-grid solar solutions thrived included clear and transparently implemented tax and import policies.¹²⁴ By streamlining processes and avoiding transaction and opportunity costs, this also reduces the cost of offering clean off-grid solutions to displaced persons.

3 Give refugees the freedom to move and host community members the right to enter camps. These rights make it easier for displaced persons to develop sustainable sources of income and improve their self-reliance. Furthermore, they enable the exchange of goods and services and the sharing of benefits between displaced and host communities. As stated earlier, free movement and trade in Rwanda helped increase the incomes of host communities as well as the trade with the broader

economy.¹²⁵ This also allows companies to employ people in camps and permits the free movement of company representatives. However, it is important to balance the opportunities that freedom of movement present and the need to protect a vulnerable community.

4 Involve displaced persons in local development plans and energy strategies. By integrating sustainable energy for displaced persons into National Electrification Plans or regional energy strategies, governments can signal their long-term commitments to energy access for displaced persons. This will send a positive message to the private sector of the government's intention to take away obstacles for investment. Currently, only 10% of countries across Africa and Southeast Asia, including Ethiopia and South Africa, include integrated plans for displaced and informally settled people in their National Electrification Plans.¹²⁶ In some cases, this is done on a local level – for instance, in Garissa county in Kenya's latest development plan.¹²⁷

5 Sign, adopt and implement the Comprehensive Refugee Response Framework (CRRF). This framework constitutes a commitment to enable the integration of displaced persons into host communities from the outset.¹²⁸ Although many host governments are struggling with the added burden and cost of hosting displaced persons, countries are increasingly committed to the principles of the CRRF. 15 countries have signed the CRRF so far¹²⁹, meaning further progress will be needed if its full benefits are to be realised. However, the CRRF also states that more assistance from international government bodies and organisations is needed to support policy implementation

¹²⁴ Lighting Global, ESMAP and GOGLA, "Off-Grid Solar Market Trends Report 2020", 2020

¹²⁵ World Bank and UNHCR, "The economics of hosting refugees", 2017

¹²⁶ World Bank Regulatory Indicators for Sustainable Energy (RISE) index, 2017, available at <https://rise.worldbank.org/>

¹²⁷ County Government of Garissa, "Garissa county integrated Development Plan 2018-2022", 2017

¹²⁸ UNHCR, "Comprehensive Refugee Response Framework"

¹²⁹ UNHCR, "Two Year Progress Assessment of the CRRF Approach", 2018

The right to work enables displaced persons to use energy for productive purposes to generate an income which they can then spend, contributing to the local economy.

on a national level. Under the umbrella of the CRRF framework, the following policy priorities should be implemented to enable successful market-based delivery of energy services to displaced persons and their host communities¹³⁰:

- **Work with aid agencies to ensure that all displaced persons have identification or stable 'displaced person status'.** The origin country and situation of displaced persons often determines the ease with which they obtain refugee status. For displaced persons who are unable to obtain refugee status, provision of displaced person IDs (that can be provided to all displaced persons, irrespective of country of origin and situation) could allow them to integrate into the host community, add to the local economy, and access basic services.
- **Provide displaced persons with the right to work.** Currently, in many countries displaced persons are not allowed to work, although, in many cases, they do work in the informal sector.¹³¹ Such prohibitions are mostly the result of political sensitivities. If host governments are dealing with local tensions and resentment towards refugees, they may be reluctant to endorse measures that imply some degree of permanence for refugee populations. However, the host country can benefit from allowing displaced persons to participate in the formal economy, paying taxes and becoming more self-reliant. The right to work enables displaced persons to use energy for productive purposes to generate an income which they can then spend, contributing to the local economy.
- **Provide displaced persons with access to financial services.** In some countries, access to financial services is limited by policy. For example, in Kenya, refugees can currently use the country's largest mobile money platform, M-PESA, for only three months. After that, they have to obtain a new account with a different mobile phone number. Identification papers can help displaced persons open bank accounts in most countries and mobile money accounts in places with high rates of mobile phone ownership and mobile money usage. This would facilitate their ability to save, send, and receive money.
- **Build the capacity of local agencies to fully implement policies favourable to displaced persons.** GOGLA's Guidance for Governments offers advice to governments in designing effective policies and regulations that will enable the off-grid solar sector, and is equally relevant in displaced settings.¹³² For instance, in Ethiopia, the right to work is officially granted to displaced persons due to the progressive implementation of the CRRF framework. However, the right is not fully effective because restrictions remain on refugees' right to open a bank account (although this is starting to change). This means that although refugees can work, they face difficulties in getting paid.¹³³

¹³⁰ Based on interviews with around 50 stakeholders within the private sector and the humanitarian domain.

¹³¹ UNHCR "Two Year Progress Assessment of the CRRF Approach"; KNOMAD, "Refugees' Right to Work and Access to Labor Markets - An Assessment: Part II: Country Cases", 2016; Asylum Access, "Global refugee rights report", 2015

¹³² Global Off-Grid Lighting Association, "Providing Energy Access through Off-Grid Solar: Guidance for Governments", 2018

¹³³ Stakeholder interviews

Conclusion

People living and working in and around camps and settlements

spent around \$1.6 billion on energy product and services in 2018. This demand is expected to increase by more than 7.6% annually to reach between \$3.9 to 5.3 billion annually by 2030.

Because more people are likely to be forced from their homes for longer times, their energy needs become more complex. Also, the ability and willingness to pay for better energy in (and around) camps and settlements is expected to improve.

Giving these people an income in cash and providing them with energy choices by offering a variety of affordable products and services is the best way to meet this rising energy demand. Setting up such energy markets can also achieve the broader ambitions of the humanitarian sector linked to improved access to energy in camps and settlements.

But giving people choices is only possible if humanitarian organisations, governments and private companies work together. Humanitarian institutions can, for example, shift away from today's aid in-kind and towards aid-in-cash. Governments can, for instance, continue adopting policies that make setting up energy markets possible. And private firms can use their expertise and experience to expand their businesses and give energy



choices to the most vulnerable people in the world.

Collaboration of this scale is likely to offer significant rewards. Giving people in and around camps energy choices may fundamentally change their lives. Better access to energy can, among other things, make people healthier, local economies stronger and energy supply cleaner. The estimated value of the economic, social, and health impacts generated by meeting the energy demands of displaced communities is higher than the per dollar cost of energy itself.

The foundations for these new ways of collaborating have been laid. The realization that the private sector will be an important partner to achieve the goals of the Global Compact on Refugees and the momentum around energy access for refugees are promising. This should be built on with thoughtful, joined testing – of financing and

business models, of partnerships, and of relevant technologies – to measurably demonstrate the value of engaging the private sector. In the long-run, successful models should be scaled up to offer energy choices to displaced people quicker, more widely and at lower costs.

This report aims to provide data and perspectives to support the idea that the private sector should play a role in providing access to reliable, affordable and cleaner energy to displaced people and their host communities. To achieve this, the humanitarian sector, governments and private companies need an increased focus on their shared goals, a longer-term view on energy in displacement, and coordinated action. After all, it is not just about access to energy, but access to more: more choice, more impact, and more opportunities.

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