UNIVERSITY OF OXFORD
REFUGEE STUDIES CENTRE

RSC Research in Brief 8, September 2018

Refugee Energy

Author: Sarah Rosenberg-Jansen (Refugee Studies Centre)

Key points

- Traditionally energy in humanitarian settings has not been prioritised: current energy provision in refugee situations is unsustainable.
- Refugees currently use energy from a huge variety of sources and overpay for unreliable, polluting, and dangerous sources of energy.
- Renewables can provide cheaper and more reliable sources of energy, while reducing the risks from conventional fuels such as burns and health impacts from indoor air pollution. Solar energy is often the most common type of renewable energy found in refugee camps.
- In Kenya and Rwanda, energy economies are emerging rapidly in refugee camps: case study evidence suggests a large range of renewable and non-renewable sources of energy are used and refugees need multiple forms of energy to meet their daily needs.
- There is emerging policy research on humanitarian energy; however, critical voices from the academic community, new data, and high-quality evidence will be essential in moving the sector forward.

Recommendations

- Humanitarian responses should consider existing uses of energy in refugee camps: it is important that humanitarian programmes work directly with communities and households to understand their energy needs.
- Renewable energy solutions for electricity in homes, businesses and for communities should be considered in humanitarian programming.
- Market-based solutions, which work with and through organic markets, should be considered where possible by implementers, NGOs, and community organisations.
- Challenging questions need to be asked on existing supplies of energy, the costs of provision of fossil fuel and diesel generators, and how renewable energy solutions can be employed to support communities.
- Additional research on energy uses, needs, priorities and practices is critically needed in humanitarian settings; evidence on refugee energy needs to be high quality and shared within humanitarian organisations.

Introduction

There are now 68.5 million people forcibly displaced people across the world, of which 25.4 million are refugees. The majority of these people have very limited access to energy to light their homes, cook their food, use to travel, or power their businesses: over 80% of refugees in camps have no access to reliable electricity (Lahn & Grafham 2015) and rely on traditional biomass for cooking. With global trends in displacement increasing and many protracted crises lasting well beyond five years, UN and response agencies are increasingly recognising the importance of long-term and sustainable planning for displaced people. Energy, including sustainable and renewable energy, forms a critical part of such responses. Recent analytical research has been undertaken on access to energy in displacement settings to understand the role of renewables in emergency and protracted response: this paper presents an overview of the issues and suggests recommendations for consideration based on the findings of this research.

Humanitarian energy is a relatively new and emerging sector, one which covers energy supply and demand for households, communities, institutions, covering a range of displacement settings, including energy for refugees in camps, urban and self-settled refugees, internally displaced people (IDPs), forced migrants, and host communities. Energy is required in all humanitarian settings, but the research summarised in this briefing paper focuses on refugee camps, specifically Kakuma camp in Kenya and Kigeme, Nyabiheke and Gihembe camps in Rwanda. This research also concentrates on renewable and sustainable sources of energy to reflect the transition currently underway in the humanitarian sector to ensure that "every person affected by conflict or natural disaster has access to affordable, reliable, sustainable and modern energy services by 2030" (UNITAR 2018).

Traditionally, energy in humanitarian settings has been provided for households through the distribution of cooking stoves and torches or solar lanterns included in emergency supply kits, while firewood is supplied for cooking. In some cases, lighting is also provided for streets, public spaces, and community facilities. Electricity is also needed for institutions, such as health clinics, schools, UNHCR and agency offices and compounds. However, the energy supplied (Lahn & Grafham 2015) is often not reliable, is expensive, and is largely dependent on fossil fuels and firewood. Reliable and sustainable energy is essential (UNITAR 2018): addressing energy needs of displaced people is one of the fundamental enablers to effectively deliver humanitarian assistance alongside social, economic and environmental benefits for displaced people and host communities.

Access to renewable and sustainable energy offers many benefits: the development sector has been considering these issues for many years and has a dedicated body in Sustainable Energy for All (SE4ALL) to support the delivery of Sustainable Development Goal 7 (SDG7) on universal access to modern energy (www.seforall.org). However, the humanitarian sector has often not prioritised energy as an issue. This is likely to be for many reasons, including the need for immediate action during emergencies and challenges to long-term planning within humanitarian response. Within the humanitarian sector, this appears to be changing as the benefits and opportunities that renewable energy can bring are recognised: renewables can provide cheaper and more reliable sources of energy, while reducing the risks from conventional fuels such as burns and health impacts from indoor air pollution. This paper outlines the key concepts and research on refugee energy, including case study examples of Kenya and Rwanda, and suggests how research can contribute to new and emerging policies on refugee energy. Case study analysis and interviews were conducted with policymakers and professionals to understand the global context for renewable energy projects for refugees, the situation in Kenya and Rwanda, and the need for evidence and academic analysis on humanitarian energy.

The Concept of Refugee Energy and Renewables

As the humanitarian sector develops its commitments to the Agenda for Humanity – reducing humanitarian risks, vulnerability and investing in long-term planning for displaced people – sustainable energy provision will become increasingly important. Renewables in particular have received attention in refugee camp settings, as many camps have a high population density and energy needs are largely unmet: it is estimated that 7 million people in camps only have access to electricity for less than four hours a day (Lehne et al. 2016). Renewables, especially solar energy technologies, are now affordable, accessible technologies which can offer a cheaper, more reliable energy supply directly to refugees, host communities, and the institutions that support them.

New sustainable energy programmes to meet the needs of refugees often focus on the use of renewable sources to meet electricity needs. In principle, renewable sources can come from wind, geothermal, biogas, and solar energy; however, in practice this research suggests that solar energy is the predominant source for refugee camp settings. This appears to be for a number of reasons: the falling cost of solar panels and products, the creation of new business models and pay-as-you-go services for solar home systems, the availability of products such as solar lanterns, and a high demand from users within camps for access to electricity. Renewable energy for cooking energy needs has been tried in camp settings, but has been largely unsuccessful – both because solar cooking technologies often do not meet the needs of users (Quadir et al. 1995) and because induction and electric cooking is expensive (Howells et al. 2006). Energy supply processes associated with cooking are also quite different to energy provision for electricity: the supply of firewood, improved cookstoves and cooking equipment is usually provided by humanitarian organisations and NGOs, while renewable electricity solutions come from a range of solutions and providers including refugees themselves, local markets, and other energy suppliers. Therefore, this research focuses on how renewables are meeting the electricity needs of refugees, as well as the policies, systems and delivery models that support the humanitarian sector in delivering renewable electricity.

Renewable technologies for electricity go far beyond solar lanterns, which increasingly are supplied as part of humanitarian response kits on arrival during emergency situations. Renewables can provide electricity access across

the household, enterprise, community and institutional levels. For example, in homes and shelters renewable electricity is used by refugees for lighting and mobile phone charging and can be used to power appliances such as hair clippers, sewing machines, TVs, radios, fans etc. Electricity is also used at the enterprise level by small businesses such as tailors, hairdressers, restaurants and shops. Power for cooling purposes, such as fridges and fans in restaurants and cafes, is essential to daily operations. Solar photovoltaic solutions with battery storage options are ideal power sources for mobile phone charging businesses. Many businesses within refugee camps also sell electrical products, including solar panels, solar home systems, and solar lanterns. For example, the photo below shows the range of electrical appliances available in one shop in Kakuma refugee camp in Kenya. Renewable electricity can also be used for lighting for public areas, craft spaces, street lighting, and community locations, as well as lighting and cooling for schools and clinics. In particular at the institutional level – for lighting, cooling, and power for UNHCR and implementing partner offices – larger scale renewable solutions such as solar mini-grids can be used to supply electricity across camp institutions.

Renewable energy sources provide off-grid and standalone energy systems for refugee camps, which in many cases can be complementary to electricity supplied from the national grid. While grid systems can offer cheap and reliable service, many locations hosting refugees are remote and are sometimes not connected to national power infrastructures. When camps are connected to the grid, it is usually to supply humanitarian organisations – offices, compounds, power for operations and institutions – and not to provide electricity access for homes. This research suggests that the perceptions of energy for refugees in the past have not considered reliable electricity access for households to be essential, and as a result, many families have not had dependable energy access for many years.

Many people in refugee communities already use solar energy – by using lanterns and solar powered mobile phone charging stations – and the further potential for solar technologies is considerable. While not all electricity users in all camps are currently using renewable sources, there are examples of solar power in many locations. The section below examines renewable energy uses in two case studies emerging from this research: one on Kenya and Kakuma refugee camp and the other on Rwanda – including examples from Kigeme, Nyabiheke, and Gihembe camps.

Renewables in Use: Kenya and Rwanda Case Studies

This research collected qualitative data on examples of renewables in use in refugee camps through interviews, site visits, and ethnographic data collection over the past two years in Kenya and Rwanda. There is a range of renewables in use in these two different countries. However, many of the technologies visible in refugee camps use relatively small-scale solar energy technologies, specifically photovoltaic technologies for electricity, to power appliances, homes and businesses. Interestingly, wind, geothermal and hydro solutions are considerably less visible than solar energy technologies. This is likely to be for a number of reasons: the low cost of small-scale solar technologies, the high levels of solar irradiance in many refugee hosting countries, the physical terrain and locations meaning that wind and hydro solutions are not often feasible, and larger investments such as biogas and large hydro tend to be expensive and complex construction projects. While solar as the main source of energy is an important consideration, it is really the uses of renewables that are critical. It could be said that there are as many types of renewable energy landscapes and uses of renewables, as situations of displacement. This section draws on examples from refugee camps hosted in Kenya and Rwanda to demonstrate the types of renewable energy uses in camp settings.

Kenya

Kakuma refugee camp in northern Kenya has been established since 1992 and hosts over 185,000 refugees mostly from South Sudan, Ethiopia, Somalia and Democratic Republic of Congo. Kakuma has a large system of informal trading and is a vibrant marketplace: it hosts a multi-income community which is economically dynamic. Within the Kakuma camps there are many examples of renewable technologies: from solar products being sold in the markets, to solar home systems for households and shelters, to training available on solar installation and maintenance, to solar powered electricity used to power businesses. The top picture on page 4 provides an example of this and shows solar panels being sold in one of the shops in the camp, alongside electrical products such as solar home systems, batteries, light bulbs, TVs and radios.

Electrical store in Kakuma refugee camp, Kenya. Credit: S Rosenberg-Jansen

Solar panels for sale in Kakuma refugee camp, Kenya. Credit: S Rosenberg-Jansen

While solar panels sold in shops are often quite expensive for camp residents, and require upfront investment to buy them, once purchased they can offer income opportunities. For example, the pictures below and on page 5 show two entrepreneurial activities powered by solar: a cinema and a tailoring shop. Both of these examples have provided the owners of the panels with the opportunity to power their livelihood. In the case of the solar cinema, electricity is used to power a TV, fan and lighting for the cinema. The business owner then charges customers a small amount to watch a film or show (usually around £0.50p). There are also examples of training programmes for refugees in Kakuma on solar energy: for example a Norwegian Refugee Council (Crown Agents 2017) programme offers the opportunity for students to learn about solar technologies, including how to do electrical repairs and installation of technologies for various purposes. The photos highlight some of these uses within Kakuma.

While activities like this are recognised by camp authorities and implementing partners, this research has shown that the fact that businesses are powered by solar energy was largely unknown to organisations within the camp. This may be due to a variety of reasons, for example that energy is a largely technical activity and there are relatively few experts on energy within the Kakuma camp authorities. However, the importance of energy – and the opportunities offered by solar powered electricity in particular – was widely recognised by refugees themselves. For example, a Burundian refugee who used solar panels to power his barber shop openly discussed with us that the camp authorities were not able to support the community in repair or maintenance for solar products, but as he was trained in electrical work in Burundi he commented "I have the knowledge to keep the system running". In Kakuma, multiple forms of renewable energy knowledge and experience are present.

One of the most commonly reported uses of solar energy was to charge mobile phones – many residents had access to a phone – and would pay to charge phones, lamps and other appliances at charging shops, which are powered by solar panels with battery storage.

Solar cinema and solar panel out for charging in the sun outside the cinema in Kakuma, Kenya. Credit: S Rosenberg-Jansen


Solar panel for tailoring business and solar street light in Kakuma, Kenya. Credit: S Rosenberg-Jansen

Kakuma camp presents a developed energy economy, with many suppliers and users of renewables within the camp. As the pictures highlight, solar energy is highly visible within the camp and has multiple applications and uses in the homes and businesses of the residents – as well as in the broader community through uses such as solar street lighting.

Rwanda

In the three Rwanda camps that formed part of this research – the story on solar is quite different. Firstly, the size of the three camps in Rwanda is much smaller than Kakuma. Kigeme in the south hosts over 20,000 refugees, while in the north Nyabiheke hosts 14,500 refugees and Gihembe camp hosts 12,400 refugees as of January 2018, with the vast majority of refugees coming from the Democratic Republic of Congo. While the electricity needs of refugees are similar – energy is still needed for homes, businesses and community facilities – the availability and supply of renewable electricity services is considerably less visible than in Kenya. The smaller size of these communities may be one important reason for this, as larger cities and population centres such as Kakuma tend to have more businesses and energy facilities. Another important reason might be the fact that these communities have not been established quite as long – Gihembe since 1997, Nyabiheke in 2005, and Kigeme in 2012. Despite this, energy activities are still very visible in the Rwandan camps, with active charcoal markets, solar home systems installed for households, and solar lanterns which have been distributed to the communities in recent years.

UNHCR and partners have had a considerable programme of free distribution of solar lanterns in Rwanda. For example, the IKEA Foundation donated over €30.8 million to UNHCR to support the provision of lighting in Rwanda and other countries, and over 300 Little Sun lamps were distributed to elderly refugees in Gihembe and Nyabiheke. As a result, many small solar lanterns are visible within the camps. However, free distribution of solar products (Corbyn & Vianello 2018) may have had a negative effect on local market systems for selling solar products as services. Although there are some examples of working solar products in the camps, these are relatively few compared to Kakuma.

In Rwanda, a market for solar home systems based on pay-as-you-go (PAYG) and leasing models is emerging. Some providers such as Zola, BBOX and Mobisol are already selling products and services to consumers within camps. The products offered by these companies differ slightly –

Solar lanterns charging on roofs in Kigeme refugee camp, Rwanda. Credit: S Rosenberg-Jansen

Solar powered phone charging shop in Nyabiheke refugee camp, Rwanda. Credit: S Rosenberg-Jansen

for example some have bigger solar panels, more lights or additional appliances available. Most solar products found through this research are primarily bought through a PAYG system, with a deposit ranging from around £12 to £45, and monthly repayments of £5 to £15 dependent on the type of system over around 36 months. This type of model makes solar home systems more affordable for households, as they can spread the payments for energy over a number of months or years. This energy is critical, as it provides lighting to see at night, and most systems come with a small battery which can be used to charge mobile phones at home. With larger systems, people are able to power efficient TVs, radios, and other electrical appliances.

As well as renewable energy for homes, in Rwanda there are also examples of mobile charging businesses and shops selling electrical appliances, such as individual solar lanterns and lighting products. For example, the picture above shows a standalone solar charging station that is being used as a small business to charge phones. There are also lively charcoal markets, exchange networks for firewood and fuel, and battery charging businesses in and around the camps. While the energy life of the Rwandan camps is perhaps smaller than that in Kakuma, it is still considerable, with energy uses ranging from traditional and fossil fuel-based technologies, to innovative PAYG models and solar energy technologies. This research finds that while the renewable energy economy in Rwandan refugee camps is small, it is emerging quickly and progressively to meet the electricity needs of the community.

There are many energy landscapes across camps in Rwanda and Kenya, as is demonstrated by the considerable variations in energy use presented above. 'Refugee energy landscapes' can be defined as: the settings, scenes, uses, and sources of energy within refugee communities, including how and why people use cooking, electricity and power to meet their needs and their lived experience of energy. Particularly important within energy landscapes in Kenya and Rwanda are the emerging 'energy economies' we see developing within communities. Organic markets for energy within refugee camps, exchanges and trades of fuel and energy sources within communities, and payment for electricity products and services are common. For example in Kakuma camp, the lived experience of energy markets is highly varied: there are many ways of buying and selling energy products and services from purchasing lanterns in the market, to buying power from mini-grid suppliers, to paying for repairs to solar panels (Rosenberg-Jansen, Njoki and Okello 2018). Energy economies in refugee camps cover the whole commercial arena supporting the production, distribution and consumption of energy in refugee communities, including: the markets, suppliers and consumers, sale and purchase, commodities, products and services, and exchanges of energy resources. Energy economies can be both formal and institutional, provided through organised channels such as sales of solar lanterns through private-sector suppliers organised by UNHCR, or informal and organic as in the case of many of the stories presented in this paper.

Institutional and Global Context

This research specifically focuses on renewable energy objects, services and products, including the systems that support them: analysing the networks and delivery models supporting the supply and installation of renewables in refugee camps. To understand the place of renewables fully in the humanitarian world, it is necessary to consider the institutional and global contexts that surround the sector. Global policy on sustainable energy for displaced people is increasingly driving towards the use of renewables for electricity provision (UNITAR 2018). This research has interviewed both the development and humanitarian organisations involved in the sector and finds several points of note. The three points below have been synthesised from over 30 interviews with practitioners and policymakers and represent the key issues raised on the global context of renewable energy programming for refugee camps:

- Firstly, **the myriad of institutions involved in renewable energy for refugee camps is highly complex, and actions are often determined largely by the organisation remits of key institutions**. As humanitarian energy is not the exclusive or dedicated mandate of any one UN agency, many institutions are involved and are active

across parts of the sector. For example, UNHCR represents refugees and their energy needs, IOM leads on internally displaced people and their energy needs, UN Habitat leads on the links between energy and shelter and construction, WFP leads on cash for energy, and various implementing partners all have different roles to play in energy supply and delivery. There is also a range of non-traditional actors engaged from outside the humanitarian space, many of whom have little experience or direct knowledge of the humanitarian sector. This adds considerable complexity to discussions, as many organisations attempt innovative programming which is sometimes at odds with the traditional flow of humanitarian priorities. For example, investing in private-sector delivery models and alternative financing schemes such as the PAYG models for solar home systems outlined above. This complexity may offer many positives – for example, technology and energy specialist organisations now involved in the humanitarian space offer the opportunity for enhanced technical skills and nuance within debates. However, these complexities mean that clear remits for humanitarian energy are only just beginning to be established and it is likely to be some time before roles and responsibilities are clearly defined.

- Secondly, **progress at the global level on humanitarian energy appears to have been rapid**. Five years ago, there was very little research, evidence or programming on renewables in refugee settings; however, many UNHCR country programmes (including Kenya and Rwanda) now have dedicated energy staff and multiple renewable projects. Global policy programmes, such as the Moving Energy Initiative (https://mei.chathamhouse.org/) and the Global Plan of Action for Sustainable Energy Solutions in Situations of Displacement (GPA) launched this July, have been creating awareness on these issues and driving forwards political ambition on energy in the humanitarian system. Such rapid progress is generally perceived as positive; however, it must be underpinned by long-term strategies for sustainable programming and continued investment in renewable energy, human capacity, and implementing and maintaining programmes. Decisions on renewables in refugee settings will need to be based on data, evidence and learning on what works and what benefits can be demonstrated for refugee communities – and understanding such priorities takes time.

- Thirdly, **the balance of global priorities and systems**, such as those outlined above, **seems at points to be at odds with the energy needs of refugees and communities themselves**. While rapid political progress seems to be underway, embedded institutional change will take much longer. Administrative desires to see renewable energy solutions on the ground may have the potential to disrupt local markets and existing dynamics on energy within refugee camps. Without high-quality data and evidence on the energy needs of refugee communities, it will be challenging for real change to be delivered. Analysis on inclusive processes for refugees on energy needs (Rosenberg-Jansen et al. 2018) is only just starting, and further programmes will need to be developed and results measured before concrete examples of success can be seen.

This research has aimed to consider both the socially constructed nature of policy and practice, and also the material presence of renewables in refugee encampment settings. However, as the discussion on global policies and institutions above suggests, the humanitarian energy sector is rapidly expanding and considerable further research will be necessary to delve into these debates in a detailed manner.

What can Researching Humanitarian Energy Tell Us?

To date, humanitarian energy and the role of renewables within the sector has been relatively limited – academic research using both qualitative and quantitative methods has been particularly scarce. With some interesting policy research (https://mei.chathamhouse.org/) and academic projects (http://heed-refugee.coventry.ac.uk/) now emerging, humanitarian energy is now rising on the agenda and will need primary and secondary research to support this process.

The Global Plan of Action on Sustainable Energy for Displaced People (UNITAR 2018) has a dedicated workstream on data and evidence, asserting that "data on humanitarian energy needs and solutions is limited and not widely shared". Academic research can support all three of the core recommendations on data and evidence within the GPA, to:

- Integrate energy indicators into planning and assessment tools for the humanitarian sector.

- Harmonise and standardise the types and forms of data collected to enable comparison and to facilitate effective monitoring and evaluation.

- Design and deliver holistic monitoring, evaluation and learning tools for humanitarian energy programmes, supporting ways to share data and best practices between the humanitarian, development and private sectors.

Specifically, new research on energy is needed to fully understand practices within the sector, create new knowledge, and develop baseline data and primary research sets on how and where energy is used in camp and non-camp settings. Very little is known about the energy profiles of self-settled refugees and internally displaced people, or the importance of energy in people's everyday lives. Anthropological researchers could find a wealth of rich details on how energy is constructed, valued and lived in settings of displacement. A core topic which has received some attention to date is the role of markets and the private sector in refugee camps – research suggests that energy markets are considerable in refugee camps in Kenya and Burkina Faso (Corbyn & Vianello 2018) – and further primary data collection could be done on the economics of exchange and energy provision in these settings. Comparative data and multi-country analysis could provide a better understanding of the energy lives of refugees across different settings. Academic analysis of any of these topics would provide new understandings of how the humanitarian community practices technology implementation, as well as a deeper understanding of the lived experiences of refugees and displaced people.

Recommendations

1) **Humanitarian responses should consider existing uses of energy in refugee camps: it is important that humanitarian programmes work directly with communities and households to understand their energy needs in order to be well-designed and inclusive.** Detailed energy and market assessments should be done before humanitarian programmes and projects are designed, to ensure that solutions match the needs of displaced people. Communities should be placed at the heart of decision-making and inclusive planning is necessary to ensure no-one is left-behind.

2) **Renewable energy solutions for electricity in homes, businesses and for communities should be considered in humanitarian programming. Electrical energy is a key need for homes, as are safe, affordable fuel and cooking solutions.** Families should be supported, where possible using cash initiatives and livelihood opportunities, to access renewable energy solutions. Supporting the development of local markets for energy can help to bring wealth and opportunities to refugees, displaced people, and the communities that support them. Many homes, businesses, and shelters are already starting to use solar energy and there are many potentials benefits of renewable sources of power to improve the health, income opportunities, and quality of life of refugees.

3) **Market-based solutions, which work with and through organic markets, should be considered where possible by implementers, NGOs, and community organisations**. Energy markets exist within many camp and non-camp situations and programming should be careful not to disrupt existing livelihoods and markets which people currently rely on for basic energy services and income. Livelihoods, jobs and economic value can be created in refugee settings due to energy services – programming should consider how value and money will be created within communities during design and implementation.

4) **Challenging questions need to be asked on existing supplies of energy, the costs of provision of fossil fuel and diesel generators, and how renewable energy solutions can be employed to support communities**. Facts to support or refute the traditional narratives on which the humanitarian energy sector is founded are essential – for example more evidence is critically needed to assess the claim that public lighting reduces gender-based violence in refugee camps. Such claims may be useful for policymakers but risk causing harm if decisions are made on mis-information and anecdotes which do not apply across communities.

5) **Additional research on energy uses, needs, priorities and practices is critically needed in humanitarian settings: evidence on refugee energy needs to be high quality and shared within humanitarian organisations**. Evidence is required not just to inform programming and deliver energy solutions that support refugees and displaced people, but in order to supply empirical evidence for decision-making across the sector. Research should provide clear and useable evidence for practitioners and academic purposes. There is a substantial need for sharing information and data in humanitarian energy settings, as considerable staff turnover and short contract lengths often mean vital information is lost within the humanitarian system.

Next steps

This research is ongoing at the Refugee Studies Centre to understand the role of renewables in refugee settings. Further outputs will be published over the course of the coming year. Academics and researchers interested in this issue are welcome to join the community of people already supporting Working Group 5 on data and evidence of the Global Plan of Action and through this support the humanitarian energy expert community currently being formed by the GPA.

Further reading

Corbyn, D. and Vianello, M. (2018) *Prices, Products and Priorities: Meeting Refugees' Energy Needs in Burkina Faso and Kenya*. Research Paper for the Moving Energy Initiative. Chatham House, London.

Crown Agents (2017) Smart solar solutions: improving energy access and empowering refugee communities in Kenya. https://medium.com/@crownagents/kate-solar-blog-d77686454f26

Howells, M., Victor, D.G., Gaunt, T., Elias, R.J., and Alfstad, T. (2006) Beyond free electricity: The costs of electric cooking in poor households and a market-friendly alternative. *Energy Policy* 34 (17): 3351-3358.

Lahn, G. and Grafham, O. (2015) *Heat, Light and Power for Refugees: Saving lives, reducing costs*. Chatham House Report for the Moving Energy Initiative. Chatham House, London.

Lehne, J., Blyth, W., Lahn, G., Bazilian, M., and Grafham, O. (2016) Energy services for refugees and displaced people. *Energy Strategy Reviews* 13-14: 134-146.

Quadir, S.A., Tara, S.S.M., and Kandpal, C. (1995) Barriers to dissemination of renewable energy technologies for cooking. E*nergy Conversion and Management* 36 (12): 1129-1132.

Rosenberg-Jansen, S., Barlow, M. Peisch, S., Ponnan, N., and Rathi, P. (2018) Sustainable Humanitarian Energy Services: Inclusive participation, lessons learnt, and paths forward. *Poor people's energy briefing* 7, Practical Action.

Rosenberg-Jansen, S., Njoki, E., and Okello, A. (2018) The lived experience of energy and forced displacement: Kakuma Refugee Camp, Kenya. Working Paper. Practical Action Publishing.

UNITAR (2018) Global Plan of Action for Sustainable Energy Solutions in Situations of Displacement (GPA). Online: http://onlinelearning.unitar.org/global-plan-of-action/

Endnote

[1] This paper gratefully acknowledges support of the Swiss FDFA Research and Dissemination Fund at the Refugee Studies Centre in Oxford and the Frederick Soddy Trust at the Royal Geographical Society.

Cover photo: Electricity lines over Kigeme Refugee Camp, Rwanda. Credit: S Rosenberg-Jansen

Refugee Studies Centre, Oxford Department of International Development,
University of Oxford, 3 Mansfield Road, Oxford OX1 3TB, UK
+44 (0)1865 281720 | rsc@qeh.ox.ac.uk | www.rsc.ox.ac.uk