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Conflict sensitivity and renewable energy: a case study from Kenya's Kakuma Refugee Camp

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Contents

Key messages

- **Though refugee camps are increasingly using renewable sources to provide clean, sustainable forms of energy, such projects are seldom designed, implemented or evaluated in ways to address their potential to provoke conflict.**
- **Considering the conflict sensitivity is important because renewable power projects can lead to unequal access to energy, potentially raising tensions among residents of the camp and with host communities.**
- **This report explores this issue by examining how the matter of conflict has been taken into account in the planning and execution of 11 key renewable energy projects in Kenya's Kakuma Refugee Camp.**
- **The findings show that the potential for such projects to contribute to conflict is rarely discussed at any stage, and that data are lacking to discern whether green energy projects have indeed led to increased friction or tension either within the camp or between residents of the camp and the host community.**
- **The authors argue that renewable energy projects can and should take steps to anticipate, prevent, reduce and address discord that can arise from such projects. The authors argue that local community engagement and the inclusion of a wide variety of local stakeholders have the potential to increase awareness of conflict as a potential ramification, and to reduce the likelihood that new conflicts erupts or that existing conflicts are exacerbated.**

1. Introduction

Refugee camps are generally set up as a temporary solution to forced displacement of people. Humanitarian aid in such camps focuses on addressing immediate, basic needs such as food, shelter and protection. Though energy is a vital component of almost all human activities, development of long-term solutions in refugee camps is regarded as an investment beyond the remit of humanitarian resources (Whitehouse 2019: 3; Grafham et al. 2016:45; Rosenberg-Jansen et al. 2019:990).

In recent years, however, humanitarian agencies have taken more developmental approaches that include efforts to adopt and use renewable energy, such as solar energy, in refugee camps. In part this is because it has been argued that renewable energy is both less expensive and more reliable than diesel and firewood (Patel et al. 2019a). Clean, sustainable sources of energy have the potential to enhance energy security and to offer "a potential method of improving humanitarian outcomes and enabling self-reliance" (Cross et al. 2019: 3).

At the same time, these projects can also change economic activities and community relationships. Such impacts include the potential to provoke conflict among residents who live in refugee camps, and to cause or exacerbate tensions with host communities, with whom relationships are often already fraught – primarily because energy is generally insufficient to meet demand in locations where refugee camps are located. Consequently, conflict sensitivity of energy projects is an issue requiring further attention so that negative impacts on existing and new conflict can be avoided and positive impacts in addressing them can also be sought.

The purpose of this report is to present a preliminary investigation on the take-up of renewable energy projects and the degree to which such projects consider the potential for conflict to arise as a result of their work. The report examines these issues at Kenya's Kakuma Refugee Camp, which has become one of the world's largest camps. This report analyses key renewable projects undertaken at the camp between 1992 (the year it was established) and 2020 to better understand the opportunities and challenges of conflict-sensitive, low-carbon development. This report is part of "Conflict Prevention and Low-Carbon Development", an international research

project that examines the potential for conflict to arise as the result of these types of renewable energy uses.[1] This is a preliminary analysis, and the list of projects is not comprehensive; as such, the report aims to encourage further identification, data sharing and feedback on related energy issues and their efforts to address conflict.

Energy in refugee camps

About 80% of refugees have access to the minimum amount of energy needed for cooking, and about 90% have access to minimum energy needed for lighting (Grafham et al. 2016). For some time efforts by the humanitarian sector to address energy supplies in refugee camps have been insufficient and/or have been undertaken late, giving rise to the view that energy-supply policymaking in these locations have been ineffective (van Dorp 2009: 5). Though the energy is provided for free, supplies are inadequate, leading refugees to undercook or ration food. Furthermore, commonly used sources of fuel for energy can have negative effects on the environment and human health. For example, burning of firewood and charcoal harms human health and adds to greenhouse gas emissions. Deforestation is compounded by collecting firewood, and, faced with limited supplies, some refugees illegally forage for the wood. Women and girls have reported experiencing sexual violence when leaving camps to search for firewood and other natural resources (Grafham et al. 2016). Indeed, searching for firewood can put refugees in competition with residents of host communities that rely on the same resources, potentially leading to hostility and conflict (Yusuf & Guensburg 2018, Betts et al. 2018).

Sustainable, long-term energy planning has not been a priority for humanitarian agencies because they have many other concerns to address. For example, uncertainties around the relocation of refugees prevent the development of long-term energy solutions (Energy 4 Impact 2018). Underfunding of humanitarian crises in general, and related budgetary limitations mean that resources are limited.[2] Moreover, there are few people with the expertise needed to address energy needs in the humanitarian context, where food, shelter and protection issues are prioritized (Grafham et al. 2016).

Brief overview of energy in Kakuma Refugee Camp

The Kakuma Refugee Camp in Turkana County in northwest Kenya was created in 1992 by UN High Commissioner for Refugees (UNHCR) in conjunction with the Kenyan government. Though it was originally designed to host unaccompanied minors from Sudan, over the years it has opened its doors to refugees from Somalia, Ethiopia, Uganda, Rwanda, Burundi, South Sudan and the Democratic Republic of Congo (DRC). The camp is said to host more than 156 000 refugees, 61% of whom are under the age of 18 (Pape et al. 2019), but latest estimates by UNHCR have put the figures at more than 196 584 (UNHCR 2022); regardless, it has become one of the world's largest refugee camps. Owing to its large size, the camp complex has evolved into four administrative zones made up of refugees of different origins (Betts et al. 2018) (see Figure 1).

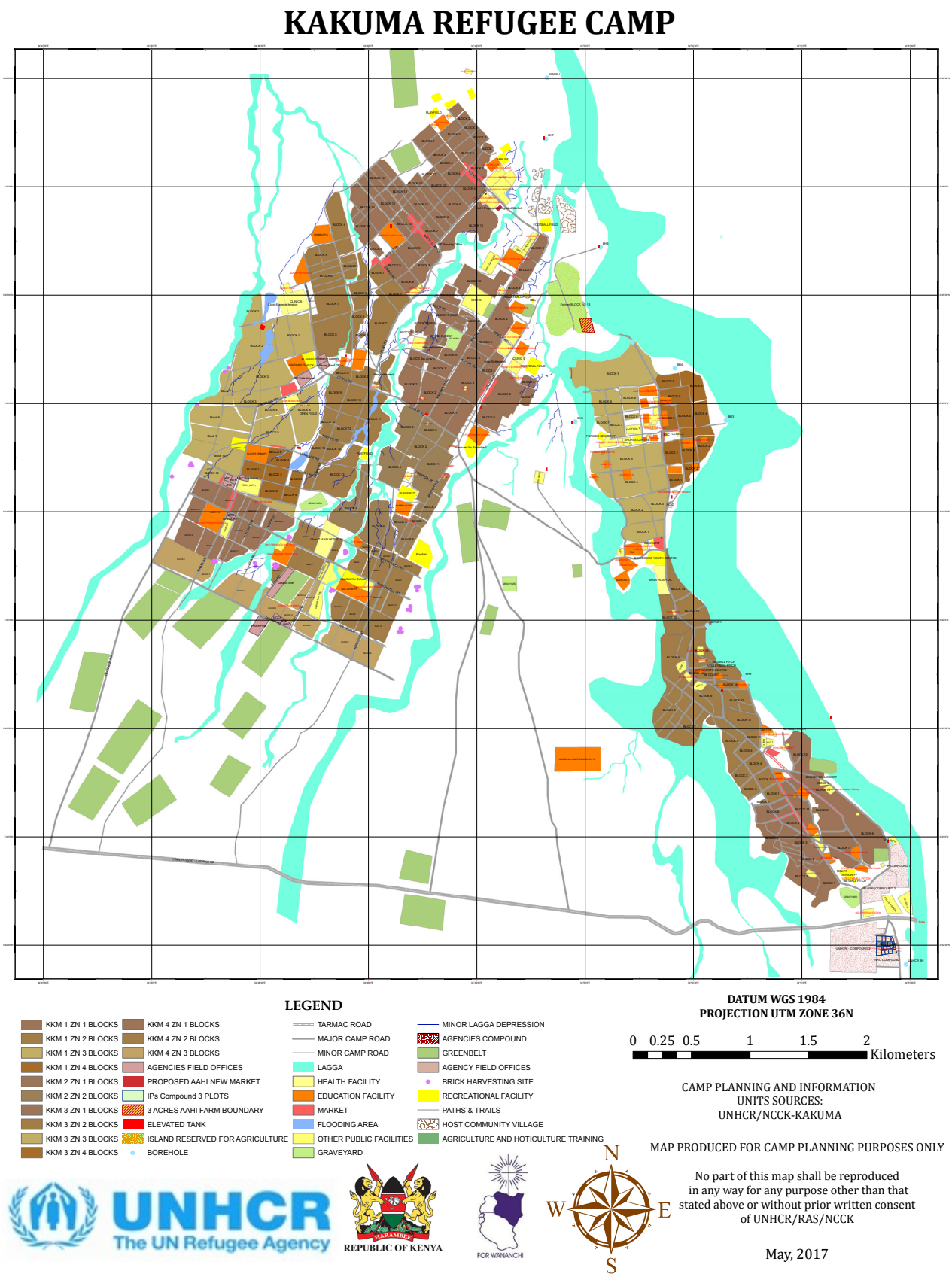
The camp is situated in a remote and marginalized region of Turkana of about 250 000 inhabitants, many of whom are members of the Turkana pastoralist community, which have the area's highest rates of illiteracy and poverty (Okello 2018b). The region is arid and making conditions challenging for widespread agriculture. Key resources such as clean water, food and sanitation are scarce. The area is also isolated from the national grid. Only 5% of residents have electricity. In the camps, the majority rely on non-biomass fuels, such as kerosene, or on wood and charcoal (Yusuf & Guensburg 2018).

The energy needs of the Kakuma Refugee Camp are high, both for households and for economic activities, and at present these needs are not fully met. The camp functions as an

1 https://www.locacons.com/

2 As pointed out by Grafham et al. (2016:47), "[t]he humanitarian sector tends to be structured around donor funding time frames of one year or less. This means that agencies cannot justify capital investments in efficiency upgrades or renewable energy equipment that would have a payback period of several years ".

Figure 1. Map of the Kakuma Refugee Camp



Source: https://data.unhcr.org/es/documents/details/58199

urban place; indeed, in Kenya, it is the third-largest economic hub, after Nairobi and Mombasa, dispelling the stereotype of refugee camps as completely desolate spaces (Jansen 2018). The camp has a wide range of businesses and economic activities, among them hospitals, schools, hotels, restaurants, bars, brothels, salons and barbershops, entertainment spaces (to watch videos and sports matches), and transportation systems, both within and from the camp. Access to energy is a main issue in the camp. Energy transmission is unregulated, and there are wide disparities between the availability and use of energy within the camp (Njoki 2018).

The main source of fuel in the camp is firewood distributed by the UNHCR through the community-based Lotus Kenya Action for Development Organization (LOKADO). Each family is allocated a free, 10kg bundle of firewood; recipients may have to walk up to 20km to a distribution centre to collect their allocation (Okello 2018d). The bundle is meant to last six to eight weeks, but, for many people, in practice, it suffices only for one week. As a result, families barter their food rations for charcoal and firewood with the host community (Okello 2018d). Members of the Turkana community collect and sell firewood as an important source of income; there have been conflicts with the host community as the result of refugees collecting firewood outside of the camp (Betts et al. 2018), with women particularly aware of the risks of violence in collecting firewood outside of the camp (Okello 2018a).

Another source of energy in the camp is electricity from mini-grids powered by diesel generators. These are mainly owned and run by individual operators who have purchased diesel generators from UNHCR auctions, or who own second-hand generators bought in nearby towns (Okello 2018c). The generators are not necessarily reliable, and they also have limited capacity to serve all needs at all times (Okello and Njoki 2018).

While unregulated, the energy market in the camp is divided by suppliers servicing particular quarters, making energy provision "highly territorial" (Okello 2018c). The costs for connection range from USD 40 to USD 100 for businesses. Households can spend USD 15 a month for two light bulbs and socket connection (Okello and Njoki 2018). This is challenging when 68% of Kakuma refugees are considered to be at the poverty line of USD 1.90 per day (UNHRC and World Bank 2021).

2. Methodology

This report is based on a desk study, involving a systematic literature review from documents in the public domain on previous and current renewable energy projects in the Kakuma Refugee Camp. The report analyses data drawn from the relevant databases, journal articles, organizational and project reports and websites – the majority of which were produced by the organizations that funded the renewable energy projects at the camp. There are few publicly available sources that provide an overview and evaluations of these projects. While there are limitations to the study in this regard, the analysis presents a first attempt to synthesize various efforts to provide renewable energy and to understand their impacts, with a particular focus on any measures taken to pre-empt or address conflict.

The study describes main features of key renewable energy projects and indicates the types of renewable energy and actors involved in energy provision. The study reports on considerations taken into account by the projects in an effort to acknowledge, identify and address their potential to have positive and negative impacts on conflict. The study does not assess the conflict sensitivity of the projects per se. Due to data limitations the study does not include a comprehensive list of projects in the camp.

3. Summary of renewable energy projects in Kakuma Refugee Camp

Eleven renewable energy projects in the Kakuma Refugee Camp have publicly available data (see Table 1). The majority of these involve solar house systems (SHS) and solar cookers, and are targeted at providing solar appliances to refugee households. Support, largely through external grants, also provides renewable energy to institutions within the camp (i.e., health centres, learning institutions and centres providing information and computer technology (ICT) services). Other projects focus on creating market-based solutions by working with small-scale renewable energy organizations to provide clean energy at affordable prices.

The projects provide evidence of the growing trend of humanitarian institutions partnering with the private sector, development agencies for sustainable energy solutions, and specialist non-governmental organizations on energy (Rosenberg-Jansen et al. 2019: 990). The projects reflect a shift from viewing refugees as dependants or beneficiaries to seeing them as agents and customers of energy services.

The camp has served as a prime testing ground for renewable energy pilots and projects. The list of projects incorporated into this report provides details, indicating each project's time frame, scope, objectives, funding sources, the renewable energy sources used, and any outputs, impacts, and evaluations.

This study also examined and investigated each project's "conflict sensitivity" – that is, the degree to which these projects sought to "minimize negative impacts and maximize positive impacts on conflict" in the design, implementation and evaluation phases (Saferworld n.d.: 4). Indeed, the absence of data and discussion on the matter of conflict sensitivity is a key finding of this report. Very few projects mentioned conflicts among refugees or between refugees and hosts with regard to accessing firewood, for example. There was no discussion on the interrelation between the renewable energy projects, forced displacements and the potential for conflict when early design phases took place, or afterwards in any assessments or analysis of what had taken place as a result of the project's implementation. There was also a notable absence of discussions or academic reviews evaluating whether or why conflict arose, or examining the significance of negative and positive impacts the projects had on the potential for conflict.

Projects generated benefits, including increased food security and reduced environmental degradation (by using solar energy instead of charcoal and firewood). Some projects led to the creation of livelihood opportunities for the refugee and host community. For example, the Bboxx initiative to provide solar panels and other renewable energy solutions created employment opportunities for 24 individuals in the camp (Whitehouse 2019: 25) (see Project 4 in Table 1). Other projects have enabled renewable energy companies to provide services to benefit refugees living in the camp. For example, the solar electrification of the International Rescue Committee (IRC) clinics increased health care services (see Project 9 in Table 1). Renewable energy projects have also helped the education sector. The Brighter Lives for Refugees project sponsored by IKEA, which provided solar lanterns to households, has been shown to have contributed to education attainment by making it possible for students to study at night, and for teachers to use of technology to a greater degree during the school day (Patel et al. 2019a) (See Project 4 in Table 1). Solar cookers provided by the Solar CooKit Project have resulted in disruption of gender roles whereby cooking with firewood was previously regarded for women by many communities (Owiti 2003: 5) (See Project 1 in Table 1).

These projects also have limitations and drawbacks. For example, solar-cooking appliances are weather dependent, restricted to outdoor usage. Kisra flatbread, a staple Ethiopian and South Sudanese food, is traditionally cooked on an open fire, making solar-cooking appliances less desirable than traditional methods. These drawbacks point to the need to consider socio-cultural norms of solar cookers that have been identified in existing literature (Kaburu et al. 2019).

Despite the lack of data and analysis by project developers and implementors, there is evidence of market-based energy projects facing conflicting interests from other projects that offer solar systems, often as free handouts. Furthermore, many of the projects tend to be pilot initiatives without plans for the long term. As a result, the long-term changes to livelihoods, and the quality of life and relationships within and between communities as a result of these projects are unclear. While most of the projects did not expressly outline their steps towards ensuring that they were aware of and sensitive to the potential for conflict to arise, members of the local camp community were included in assessments in project planning and in the implementation phases.

Table 1 highlights key aspects of 11 renewable energy projects in the camp. The last column shows potential conflict sensitivity approaches that can be taken. Based on the available data on project evaluations and impact, suggestions broadly call for i) a programmatic approach, which might require longer-term sustainability considerations of projects and food, education and other cross-sectoral consideration; and ii) methodological approaches that might enhance monitoring of projects or enhancing the target user groups. (These two approaches are not mutually exclusive; indeed, both often are required for comprehensive efforts at conflict sensitivity.)

These suggestions call to attention to the need to examine ways to not only maximize positive impacts of renewable energy but also to explore the potential negative impacts, which may not be immediately apparent. Many of the projects had taken only narrow or no efforts to conceptualize *for whom* conflict was a potential concern. Thus, these suggestions focus on the various groups, both within the camp and in host communities, that will experience both negative and positive impacts.

Table 1: Key features of 11 renewable energy project in the Kakuma Refugee Camp

	Name	Time period	Scope and aims	Specifics	Funders	Outputs/ Impacts	Evaluation of benefits and limitations	Potential enhancements to conflict sensitivity
1	Solar cookers Project (Solar CooKit)	1995-2004	Covered Kakuma area 1. The project aimed to a) make solar cooking commonplace by the end 2003, and b)reduce amount of firewood used and the resources used to purchase firewood.	a). CooKit solar panel cookers[3]	Solar Cookers International	a) The usage of Solar CooKit was 70% [for the project target group] in the camp at the end of fiscal year 2003. b) The amount of firewood used fell by 25% for households that used solar cookers. c) Households that used solar cookers were also able to use them to pasteurize river water (Owiti 2003: 13).	a) Its highest use of these cookers was among the project's intended target group of the project beneficiaries. Take-up was lower among vulnerable groups (Owiti 2003: 5). b) The project was small in scale, limiting its potential impact when the refugee population increased. c) CooKit solar panels tend to be fragile, especially in windy environments. Solar cookers are slower than some other methods used to prepare food. They are not optimal to make certain meals (e.g.. kisra) (Owiti 2003).	Methodological approach to maximize positive impacts of solar cooking on various groups within the camp
2	Energias de Portugal (EDP) Kakuma Street Lighting Project	2010-2013	The project installed solar street lights, and a set of integrated renewable energy solutions (Bizzari 2010: 35) (i.e., solar water purifiers, solar ovens and solar flashlights (EDP n.d.). The project aimed to a) enhance the living environment of the camp, and b) devise a standard approach to sustainable renewable energy that can be adopted in other refugee camps (EDP n.d.).	a) Street lighting b) Cooking c) Irrigation d) Solar water purifiers	a) Energias de Portugal (EDP) b) Installation by Don Bosco Kakuma	a) Distributed 4,500 rechargeable solar lanterns for free to students b) Installed 31 solar street lighting posts (10 in the host community) c) Installed institutional solar systems of 1-3kW that covered 4 schools, 3 hospitals, 1 system at the Don Bosco training facility, 1 solar/wind hybrid system at UNHCR's compound, and 1 water pumping system (Patel et al. 2019a:17) d) Distributed 30 solar ovens to an association that supports women in danger The introduction of solar water purifiers increased availability of drinking water and irrigation water. Both the refugee and host community benefitted (EDP n.d.).	a) The institutional systems installed through this project were maintained for three years; these systems then stalled as a result of shortage in funding (Patel et al. 2019a:17). b) Short-term functioning: three of the ten systems installed are functioning; the others have either returned to using diesel or no longer have power (ibid).	Programmatic approach to minimize negative impacts and maximize positive impacts on individuals, host communities and other user groups and across multiple sectors

3 This project was one of the first to use CooKit, a cooker lined with foil to reflect sunlight. See for further details: Most significant solar cooking projects | Solar Cooking | Fandom

	Name	Time period	Scope and aims	Specifics	Funders	Outputs/ Impacts	Evaluation of benefits and limitations	Potential enhancements to conflict sensitivity
3	Brighter Lives for Refugees Project	2016-2018	The project aimed to a) distribute solar lanterns to 36,000 households (Patel et al. 2019a), and b) install 900 solar street lights in Kakuma and 350 in Kalobeyei (Patel et al. 2019a).	a) Solar street lamps b) Solar lanterns	a) Funded by the IKEA Foundation, which has provided over USD 198 million to UNHCR's operations, including for renewable energy projects (Giæver n.d.: 42) b) Implemented by UNHCR and involving Solar Street Lights Users Association		There is need to a) link the project with livelihoods and the education sector, and b) develop a solid sustainability plan that is centred on community ownership of the entire project, particularly the solar street lights (Patel et al. 2019a:30).	Programmatic approach to better assess the positive and negative impacts particularly at the household and community level
4	Moving Energy Initiative (MEI) partnership with Bboxx Capital (Kenya)	2017	The project aimed to a) increase the distribution of high-quality solar products in the camp, b) facilitate Bboxx access to the Kakuma market by setting up retail shops and assisting in marketing activities (e.g., through roadshows to raise awareness on products and services), c) enhance access to affordable and reliable energy.	a) Solar Home Systems b) Solar lanterns c) Improved cook stoves	MEI awarded Bboxx a grant of over GBP 30 000 to establish operations in Kakuma (Cohen & Patel 2019: 24). With support from Energy 4 Impact, Bboxx offered trainings and support on energy issues (Whitehouse 2019).	The project a) sold 104 solar home units, b) carried out marketing that reached 1,000 people, and training activities that reached 45 entrepreneurs (Whitehouse 2019: 24).	a) Transportation costs are high as the main Bboxx office is in Kisumu, 570km away from the camp. b) Staff costs are high, due to the substantial presence of NGOs, which raise the prevailing market rates for labour in the area. Evaluation by MEI concludes: a) Sales after the initial trial were not commercially viable: "Bboxx sold 104 solar home systems (75 of them bought through MEI funding). This figure is low in relation to the potential market size" (Whitehouse 2019: 25). b) "Potential replication of model by other aid agencies but this is 'distortive' expansion if the market actors and activities are continuously supported by external actors... direct dependence on aid agency assistance and doesn't demonstrate 'crowding-in'". c) "There is little to suggest that MEI market-based activities in Kakuma will continue at the end of the MEI project funding". d) "Unknown if other energy providers entering the market" (Whitehouse 2019: 24).	Methodological approaches to minimize negative impacts and maximize positive impacts of introduction of market-based energy systems

	Name	Time period	Scope and aims	Specifics	Funders	Outputs/ Impacts	Evaluation of benefits and limitations	Potential enhancements to conflict sensitivity
5	Market Based Energy Access Project (MBEA I)	2017 - 2019	Expansion of private-sector energy delivery through creation of a value chain for energy products in the Kakuma camp and host community (Groen 2020: 6) Objectives: a) To offer support to clean energy entrepreneurs, by enabling their entry into the camp market by generating a market supply b) To create sustainable market-based energy access, c) To raising awareness about MBEA d) To enable the both refugee households and businesses to have market-based access to cook stoves, solar energy and electrical services (SNV 2020a)	a) The project sought to expand the use of clean-cooking practices by creating market for efficient fuel and locally made stoves, "Matawi, Jiko Kisasa, rocket stove inserts" (SNV 2020a: para 4). b) The project introduced an innovative payment method Pay as you go (PAYG)[4] to enhance access of the solar market/appliances (SNV 2020a).	a) Funded and designed by the Energising Development (EnDev) programme b) Implemented by SNV Kenya, working with the refugee community (Groen 2020:7)	The project's anticipated outcomes were as follows: - a) 16 500 people to gain access to clean cooking b) 21 200 people to gain access to solar for lighting and phone charging c) Creation of 90 jobs d) Equivalents of 2241 CO2e annual reduction in CO2 emission (in t CO2e) from project intervention e) Equivalents of 682.8 CO2e annual reduction in CO2 emission (in t CO2e) from project intervention f) Creation of 100 Energy Entrepreneurs (SNV 2020a, see also SNV 2020b)	SNV, the project's implementing organization, concluded: a) The project faced initial resistance from zonal and block leaders who argued that refugees had no capacity to purchase products introduced through MBEA I (Groen 2020:11). b) The customer base in the camp is accustomed to free provision of products; this made it particularly challenging to introduce commercial products or services, especially if they were the same as those provided for free. c) Traditional cooking practices are deeply ingrained; this explains the slow uptake of solar cooking stoves. d) Some users stoves in the camp were unable to continue using them because project partners were unable to maintain the supply of bioethanol fuel. e) The costs of purchasing new stoves are high (SNV 2020a).	Programmatic approach to minimize negative impacts of market-based energy system and maximize positive impacts on users including households and businesses
6	Market Based Energy Access Project 2 (MBEA II)	2019 - 2023	This project is a continuation of MBEA I with an expanded scope. Objectives: a) To enable access to solar lighting for vulnerable households b) To enable the sustainable availability, adoption and use of solar appliances and stand-alone cookers c) To enable suppliers and users of the clean energy systems (refugee community) to access credit (Cohen & Patel 2019)	It aims to foster the use of technologies which are solar powered for businesses within the camp. While MBEA I sought to enable access to solar products and solutions to households, MBEA II aims to expand use among local institutions within the camp (Groen 2020:15).	a) Funded by The Energising Development programme (EnDev) III b) Implemented by SNV	Projected outcomes: a) Increased access to clean cooking (reaching 7500 people, 173 microenterprises and 58 social institutions) b). Increased access to electricity (reaching 30 000 people and 625 microenterprises) c) Creation of 75 jobs along the value chain (SNV 2020c)	The project is ongoing. As yet there has been no evaluation.	Programmatic approach to minimize negative impacts of market-based energy system and maximize positive impacts on users including households and businesses

4 Pay as you go (PAYG) solar is a flagship project aimed at making clean energy affordable. See "Mobile-enabled energy for humanitarian contexts: The case for pay-as-you-go solar home systems in Kakuma refugee camp" (GSMA 2019) for further detail.

	Name	Time period	Scope and aims	Specifics	Funders	Outputs/ Impacts	Evaluation of benefits and limitations	Potential enhancements to conflict sensitivity
7	Project Jua	2017 - 2020	To electrify schools and clinics through the installation of six 800W solar systems in schools and clinics in Kakuma (Patel et al. 2019a:16)	a) Solar photovoltaic) (PV) systems b) Lighting for schools and clinics	a) Funded by Ovo Foundation b) Implemented by Energy 4 Impact c) Installation and maintenance by Sollatek (Patel et al. 2019a: 16)	a) Increased time (3+ hrs) spent by students on schoolwork and studying in early mornings and evenings b) Increased morale among teachers, who were able to incorporate ICT in their teaching c) Improved healthcare and treatment outcomes (Energy 4 Impact 2020) (See also OVO Foundation 2021.)	At the time of writing, there was no evaluation but since a report on social return on investment that focuses in particular on sustainable future prospects of youth and children has been published (see OVO Foundation 2021).	Programmatic approaches to minimize negative impacts and maximize positive impacts of new and alternative energy on various groups within the camp
8	Solar-Powered ICT Nuru Access Centre and Learning Hub	2017 - 2019	a) To create a safe space to access digital, creative and business services b) To facilitate the provision of skills training, commercial services such as photocopying and phone charging and opportunities for local schools	a) Solar-powered ICT hub	a) Commissioned by Moving Energy Initiative b) Delivered by Crown Agents (Crown Agents n.d.)	a) Envisioned that half of the hub's users would be female	No evaluation in the public domain on this project	Methodological approach to maximize positive impacts of energy access on various groups within the camp
9	Solar Electrification IRC Clinics 5 and 6	2018	a) The project aimed at the solarization of two healthcare clinics, clinics 5 and 6 managed by the IRC at Kakuma camp b) The use of solar was aimed at reducing the operational costs with the savings made being channelled to further enhancing existing healthcare programmes	a) Solar systems at the clinics	a) Set up and managed by Kube Energy b) Funded by an MEI grant worth USD 200 000 (Grafham & Lahn 2018:50) c) Implemented by PowerGen	a) Reduced CO2 emissions by 4.136 tonnes per month/ 49.63 tonnes per year' (Patel et al. 2019b: 28) b) Reduced fuel costs, compared to those associated with diesel generators	a) The two installed solar systems have significantly reduced amount of diesel consumption, saving USD 30,000 a year. b) Delivery of health care services has improved as a result of, for example, the ability to store vaccines on site.	Programmatic approaches to minimize negative impacts and maximize positive impacts of new and alternative energy on various groups within the camp
10	Heliac Solar Cookers	2018-ongoing	Distribution of Heliac solar cookers in Kakuma		Solar Cookers International (SCI)	SCI distributed 40 Heliac solar cookers to over 350 people in the Kakuma Refugee Camp.		Methodological approaches to maximize positive impacts of cookers on various groups within the camp
11	Sun Buckets Project	2018-ongoing	a) Sourcing free, renewable energy safely b) Providing portable and practical cooking solutions	Sun Bucket cooking appliances	a) The University of Illinois-Urbana Champaign provided a grant of USD 250,000. b) The project was implemented by Eco Mandate Ltd.		a) As opposed to other solar cookers, Sun Buckets do not require direct sunlight thus can be used at any time of the day (see Solar Cookers International 2019).	Methodological approaches to maximize the positive impacts of Sun Buckets on various groups within the camp

Source: Authors

4. Conclusions

This report examines the effects of the increasing take-up of clean energy sources within Kenya's Kakuma Refugee Camp. The 11 key projects identified show evidence of having enhanced critically needed energy access within the camp. Nevertheless, energy poverty remains rampant. Access is insufficient and uneven for both households and businesses – both in the camp itself and in the host community. Not all refugees have equal access to energy, let alone to clean energy. Also, a majority of the renewable energy projects tend to be pilot schemes. This means that projects lack continuity, or they stall after a short duration.

The analysis sought to better understand how such projects deal with the matter of the potential conflicts that they may create or exacerbate – both within the camp and with host communities. Our findings show that there is a lack of information about measures projects took to be sensitive to the potential for conflict – an issue that warrants greater attention. At the same time, some evidence suggests that some projects engaged local community groups in ways that might address the conflict-related matters; these were not specifically designated as being steps taken to address the issue, however.

We argue that projects need to explicitly consider the potential for conflict, by incorporating the issue into the planning, execution and evaluation of such projects. The inclusion of refugees and neighbouring residents in design, planning, implementation and review of the programmes has the potential to enhance the success of projects and to mitigate conflicts that can arise over access and the implications of access to energy from both fossil fuel and renewable sources. Methodological approaches that help continually refine understanding of renewable energy use – to think about when and how energy is being used, and by whom – can also address potential negative impacts before and during project implementation. A more comprehensive programmatic approach to conflict sensitivity to energy access and sustainability that considers implications to other sectors and resources can have positive impacts. Further study is warranted to understand how renewable energy projects can be more sensitive to subject of conflict that they can create or exacerbate in such settings, particularly where demand for energy exceeds supply. Empirical research involving diverse stakeholders can help illuminate practical, on-the-ground measures to address conflict and to mitigate it when it arises. We urge further academic study to better understand how renewable energy projects can play a role in improving the lives of people in refugee camps and in preventing potential conflict and alleviating existing conflict in and around humanitarian settings.

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