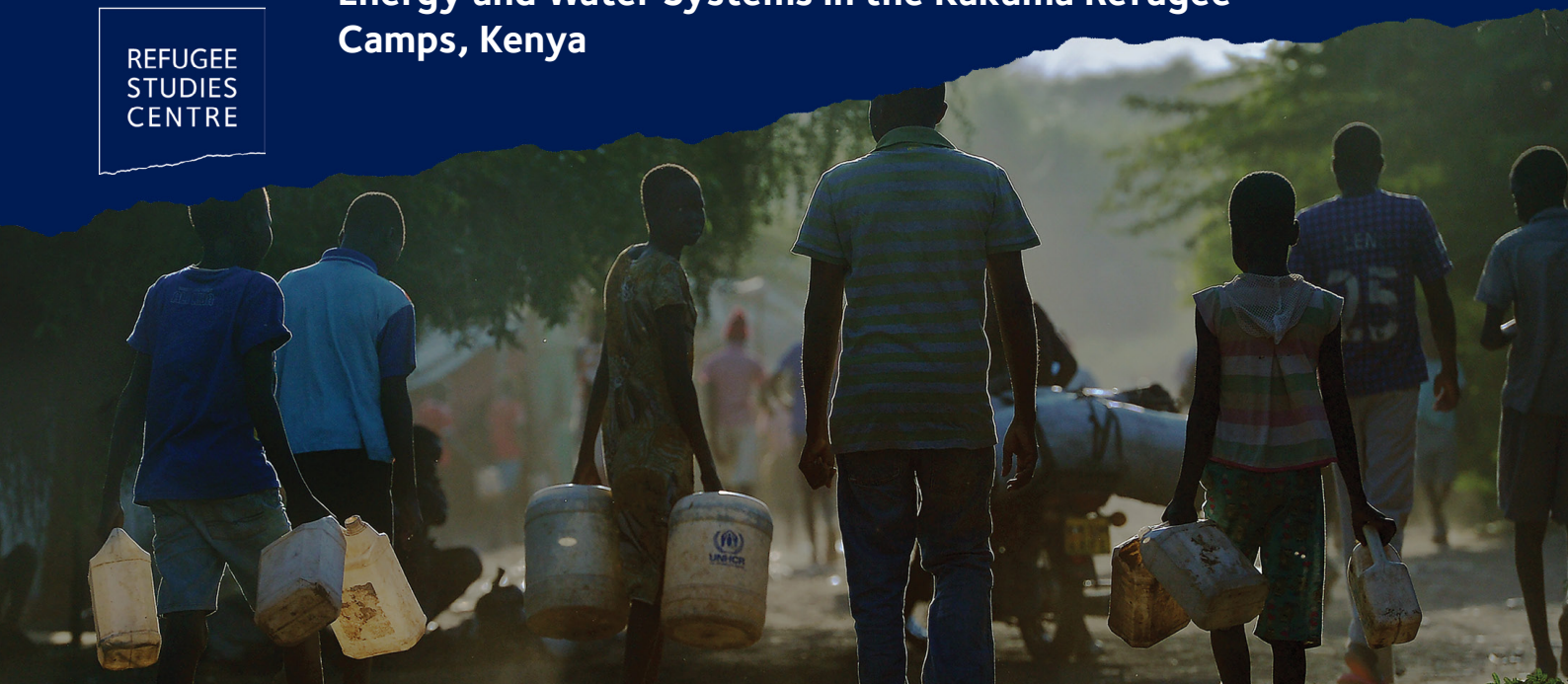


Informal versus Formal Infrastructure

Energy and Water Systems in the Kakuma Refugee Camps, Kenya



Collecting water in Kakuma 4 refugee camp. Photo: UNHCR/Anthony Karumba

Key points

- Infrastructure and public services in the Kakuma refugee camps are provided through a vast range of delivery mechanisms and actors – both formal and informal.
- Water is provided formally by camp agencies, while the energy system is largely supplied through refugee and host community businesses.
- Even where camp infrastructure is centrally planned and agency-provided, unregulated refugee activities are crucial to its functioning.
- Infrastructure provided by the international community is limited largely to supporting domestic needs under UNHCR's protection mandate but does not account for the requirements of refugees' livelihood activities.
- Because current resource provision activities generate income for refugee entrepreneurs and members of the local host community, any plans to change these systems should consider both winners and potential losers.

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Summary

Refugees who pursue livelihoods in protracted encampment contexts are held up as exemplars of self-reliance, but their success relies on access to basic resources and infrastructure. Such amenities are often lacking, however, because refugee camps are seldom included in state infrastructural development, and resources provided by camp agencies are intended for domestic use, not livelihoods. Nonetheless, the systems of water and energy use in Kenya's Kakuma refugee camps exemplify the ways that refugees acquire the resources needed for their livelihood activities, either by creatively re-distributing resources from formal systems of humanitarian provision, or by seeking alternative sources of these basic goods. Findings show that the form of infrastructure available in a camp has implications for safety and sustainability, refugee livelihoods, and refugee-host relations.¹ Interventions to improve resource provision and camp infrastructure must consider the various consequences for differently positioned actors.

Infrastructure and refugee livelihoods

Just as in a city, certain forms of infrastructure are necessary for the operation of refugee camps and settlements. Due to UNHCR's protection mandate, these systems are generally designed to ensure adequate resources such as water and cooking fuel for domestic use, as well as mandated protection services such as education, food relief, and health care.

However, recent UNHCR policies focusing on self-reliance have acknowledged that these resources are also crucial for the success of refugee livelihoods. UNHCR's 2009 urban refugee policy focused on refugees living beyond conventional humanitarian support, especially in cities and often without full legal rights and recognition. Aside from advocating for the right to work and freedom of movement, this policy emphasised the need to "use advocacy and capacity building measures to enhance refugee integration into private and public services and institutions that can boost livelihood development and self-reliance".² However, because the existence of water, energy and other utilities is taken for granted in urban areas, the focus was primarily on soft infrastructure like access to finance, training, business networks, etc.

More recently, UNHCR's *Policy on Alternatives to Camps* acknowledged that camp settings are sometimes unavoidable, especially in the early phases of an emergency or where refugees face legal, social and political constraints. The policy recommends realistic ways to transform camps into more sustainable settlements, proposing "synergies with national development planning... in areas such as education, healthcare, nutrition, water, sanitation, housing, energy and employment."³ The organisations involved in the Moving Energy Initiative have furthermore identified energy provision to displaced populations – previously limited to cooking fuel, school lighting, and heat in cold locations – as a target for humanitarian and private sector cooperation and a crucial requirement for sustainable refugee livelihoods.⁴

Infrastructural development has long been at the centre of UNHCR's efforts to bridge the divide between short-term humanitarian aid and longer-term development assistance. The zonal development schemes of the early 1960s and ICARA I and II⁵ were both attempts to bridge the humanitarian-development gap by improving infrastructural capacity in African countries in a way that would mutually benefit refugees and host communities. Unfortunately, neither was substantially enacted due to funding shortfalls, lack of interest among development institutions such as UNDP, and hesitance on the part of governments unwilling to accept their hosting responsibilities on a permanent basis.^{6,7}

These problems continue to constrain UNHCR and limit refugee's rights and economic possibilities in their countries of asylum. However, when the resources required for businesses, domestic use and other activities are not provided by humanitarian organisations, refugees attempt to

obtain them through alternative means. In many camps, an innovative, flexible, unregulated network of *informal* resource provision and distribution exists beneath the *formal* system,⁸ as evidenced during research by the Humanitarian Innovation Project (HIP) in Kenya, Jordan, and Uganda.^{9,10}

HIP's Refugee Innovation project showcased how entrepreneurs could turn an infrastructure deficiency into an opportunity. To provide a common example, enterprising camp residents use generators to sell electricity to neighbours and local businesses. However, while these cases of innovation may be celebrated, several questions emerged, which are at the heart of this research. This Research in Brief therefore summarises key findings from five weeks of qualitative field research exploring the following questions in the Kakuma refugee camps in Kenya:

1. How do the informal, refugee-run components of camp infrastructure systems interact with the formal components?

2. How do the formal and informal qualities of infrastructure systems impact refugee livelihoods?

3. How is infrastructure conceived by different stakeholders, including humanitarian agencies, the government, the host community, and refugees themselves? Relatedly, how does formal or informal infrastructure influence relations between refugees and hosts?

Water and energy systems in Kakuma

Kakuma refugee camps are located in the arid plains of Turkana County in north-western Kenya. Despite the camps' remote location, they are a hub of economic activity for Turkana County, as evidenced in the many shops and small businesses operated by refugees and Kenyans alike. The Kakuma 1 camp was established in 1992 and is host to the largest and busiest market areas, predominantly run by Somali, Ethiopian, Sudanese and Congolese entrepreneurs. The remaining three camps have relatively less dense populations and smaller markets but have expanded in recent years due to the influx of people fleeing violence in South Sudan. Across the dry bed of the seasonal Taarash river, Kakuma town is home to a diverse array of people from across Kenya, including many who came north seeking business and employment opportunities. Turkana herders from the surrounding plains, many of whom have lost their livestock to droughts or raiding, have settled in small villages around the camp to seek alternative livelihoods, and others send their children to Kakuma's schools. Those with animals often remain further afield, coming to town occasionally to purchase goods or meet family members. UNHCR and its partners are building a new camp 12 km north of Kakuma in Kalobeyei, which was already occupied by over 1,000 refugees at the time of research.

The research presented here began as a comparative study of water and energy infrastructure. **Water in Kakuma is provided through the UNHCR and its implementing partner the Norwegian Refugee Council (NRC)** and so offers a case of a largely formal system of provision. **Energy, including both electrical power and cooking**



Solar-powered street lighting in Kakuma camp. Photo: Roland Kalamo

fuel, is provided almost entirely by camp residents and local Turkana people on a for-profit basis. Water and energy therefore seem to exemplify formal and informal systems of resource provision, respectively, as defined by whether the system is designed and regulated by a central agency versus decentralised and emergent.

The primary water system is sharply divided between a formal system of provision and an informal system of collection and distribution. The NRC oversees the drilling of boreholes, the installation and operation of immersive pumps and generators, and the distribution of water to raised water reservoirs around the camp. Water is dispensed from these reservoirs to various taps for collection by residents. Although the daily water requirement per person is measured volumetrically – 20 litres per day – distribution is measured by the periods of time that water is released from the reservoirs to the taps. The NRC provides a schedule for each tank, according to which ‘incentive workers’ (informal camp employees working for restricted monthly salaries) from the local area turn the valves.

When the water is released to the taps, people assemble in queues to fill their jerrycans. At this point, distribution takes on an informal character, although **the NRC has implemented WASH (Water, Sanitation and Hygiene) committees** of locally elected community members to supervise this process. Each tap consists of four nozzles, and each household is designated one nozzle, as well as a number to indicate their order in the queue. Wealthier families and those operating businesses may send an employee to collect on their behalf, often someone from the local Turkana community. During water shortages, or when a tap breaks at one location, refugees from other locations may transport water to those who lack it, charging a carrying fee of 20–30 Kenyan Shillings (KSh).¹¹

Energy, on the other hand, is provided almost entirely by local refugee and Turkana business operators and traders. Refugees who own generators provide electricity at specified times during the day to their neighbours and nearby businesses, charging a monthly fee based on the items they are powering regularly: light bulbs, charging outlets, televisions, refrigerators, etc. Turkana people bring firewood and charcoal – produced locally using rudimentary ground-burning techniques – to sell in the camp for cash or barter, often accepting unwanted food aid as payment. There is very limited formal provision of energy resources: the local NGO Lokado provides small rations of firewood to each family, and other partners such as the German government’s GIZ have provided street lights in some locations and solar lighting at schools.

Although a greater proportion of the energy system’s activity takes place in the informal sector, the water and energy systems each include both formal and informal components. For the water system, informal alternatives provide a form of backstopping when there are problems. In



Well for groundwater, dug by refugees. Photo: Roland Kalamo

2015, there were water shortages across the camp, in part due to an inadequate number of boreholes and poor management of water distribution by the operating partner in charge of WASH at the time. UNHCR requires each person to receive 20 litres of water, but at this time people were receiving as little as 5 litres each. To make up for the deficit, people turned to an informal water market that expanded in response to the crisis. Some people living adjacent to the Taarash (such as those in Blocks 7, 8, and 9 of Kakuma 1) could collect water at the river. Others could purchase water in Kakuma town, where pumps were still yielding water. Refugees could pay for the water to be transported to their homes via large hand-pulled carts called *mkokoteni*, bringing the total price per jerrycan to 50KSh. Similarly, the firewood rations provided for free by Lokado do not often last the month, and households turn to the local Turkana community to purchase supplementary cooking fuel.

Based on field visits, interviews and focus groups, **Figures 1 and 2 summarise some of the common elements in the complex networks that constitute the energy and water systems** in the Kakuma camps. Many activities – such as maintenance of infrastructure – do not fit neatly into either the formal or informal sector. Additionally, some ‘unregulated’ activities by refugees are well known to and tolerated by humanitarian and governmental agencies, but the formal or informal nature of this condonation is unclear. Nonetheless, the formal/informal distinction is a useful generalisation to explain the consequences of different forms of resource provision.

Safety and sustainability

An obvious difference – one that is definitional to the formal-informal distinction – is the form of **regulation and oversight** imposed upon the system. The NRC exerts almost complete

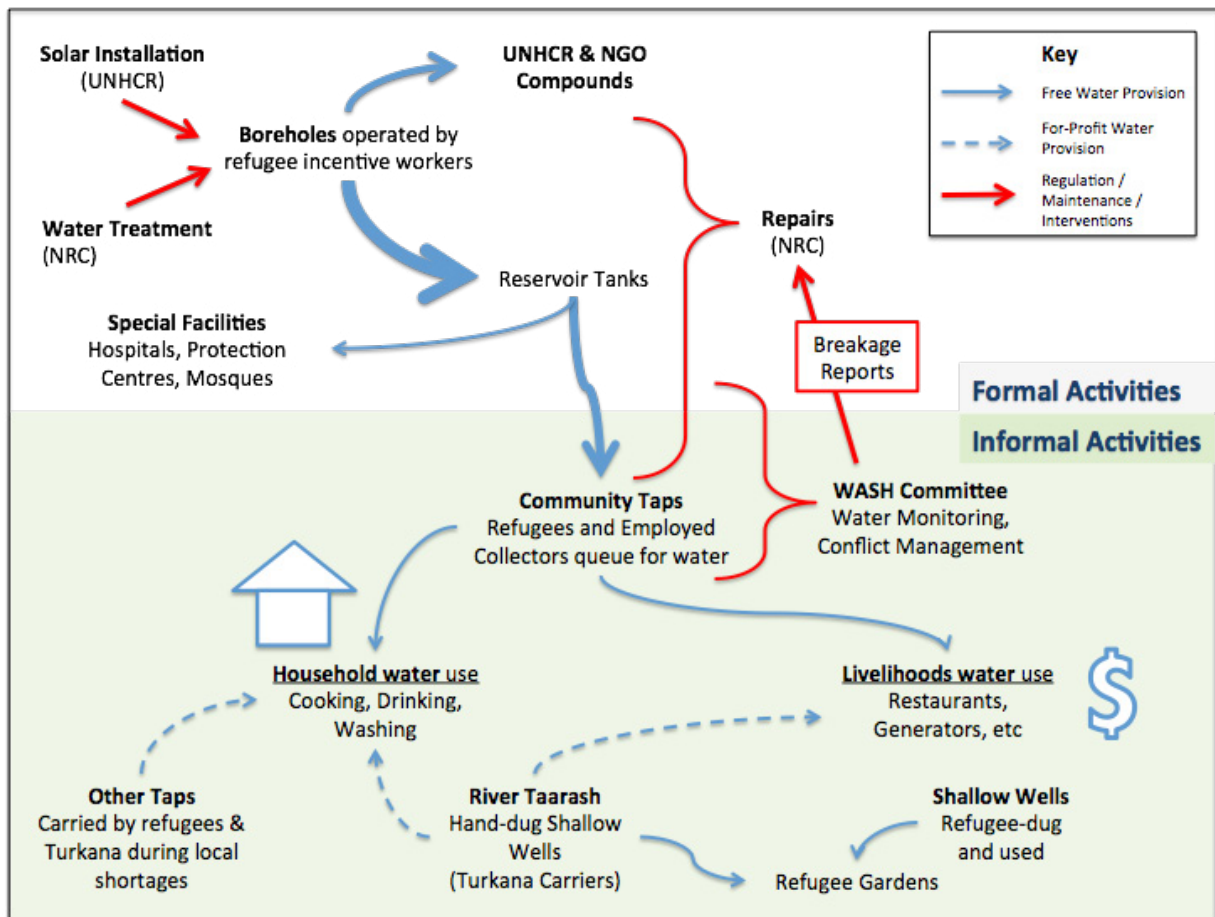


Figure 1: Formal and informal water system in Kakuma

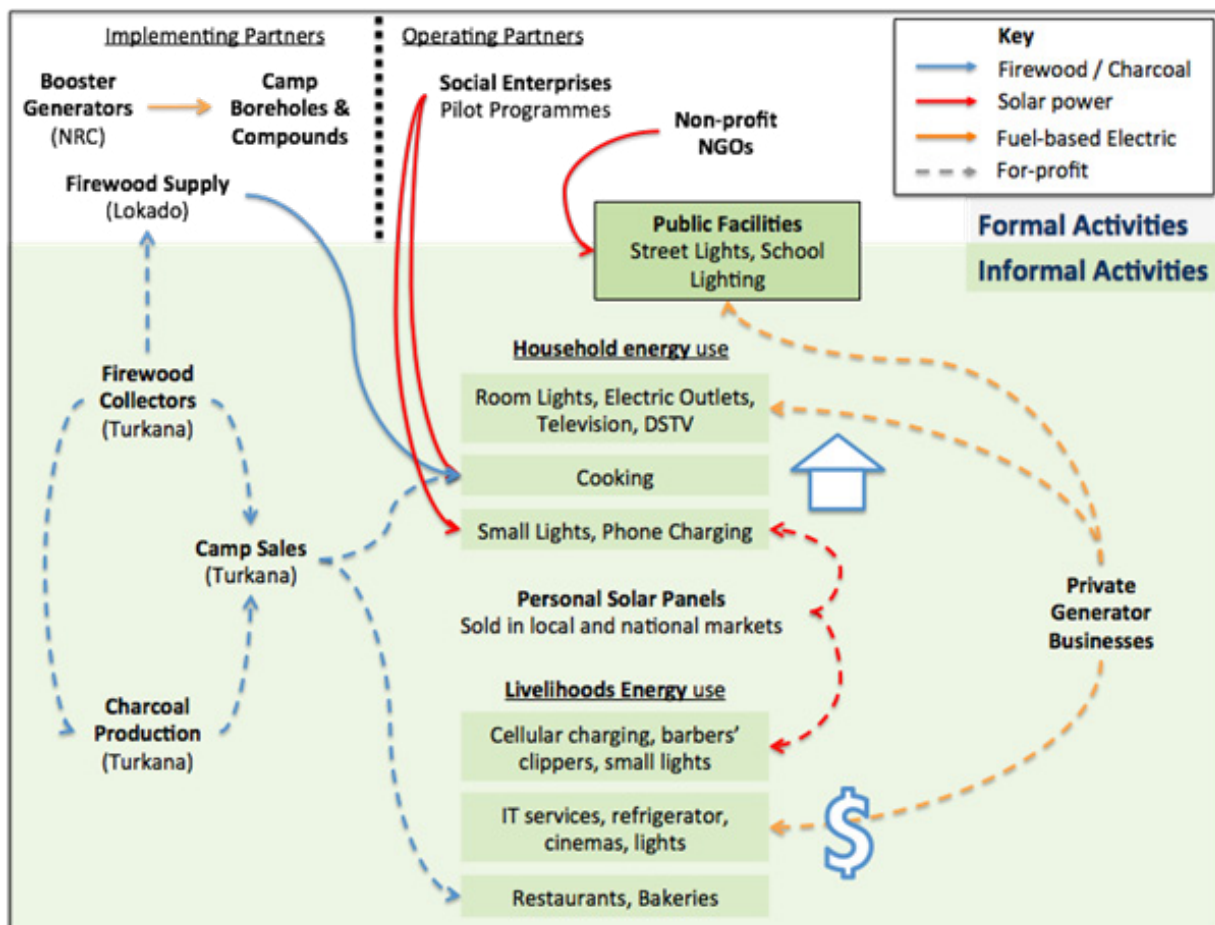


Figure 2: Formal and informal energy system in Kakuma

control over the water system from borehole to tap in Kakuma, with the exception of water from hand-dug shallow wells. **Water** is pumped according to a strict timetable to ensure equitable distribution. Pumping at the boreholes is reduced by 25% during drought periods, and new boreholes are dug when population increases cause local shortages.

The chaotic scene during water collection, which can even culminate in physical brawls, conveys an aesthetic of informality. But despite the apparent disarray, **WASH committees** elected from among the community conduct regular tests of the water's chlorine content, supervise maintenance of the water facilities, accept complaints, and manage community conflicts over water collection. Water committees can resolve many issues locally, sometimes collecting money from community members to fix basic breakages, but report to the NRC when problems are beyond local capabilities for repair.

Most of the **energy** infrastructure, on the other hand, is not subject to formal regulation. Turkana firewood distributors make their informal sales in parallel to and independent of Lokado's distribution of free firewood. They are legally prohibited to cut live standing trees by the Government of Kenya, but there is limited capacity to enforce this law. Some formal electricity provision exists, but it is limited to NRC-managed generators designated solely for pumping water from the boreholes to the water reservoirs.

Granted, generator operators need to maintain some order for their businesses to function. But local enforcement is difficult and many often find themselves immersed in a sea of problems, as explained by one former energy provider in Kakuma 3:

"I had a private generator which I used to supply power to customers in need of electricity. But some customers did not know how to use power; they made bad connections which spoiled my generator... Some customers used to steal the power, connecting it to non-paying houses without my knowledge. Eventually the generator broke down completely and was not functioning any more... I don't supply power to customers now."

Aside from damaging the generators, poor connections can be dangerous, and we heard numerous cases of fires and electrical shocks, some of which resulted in death. But updating the infrastructure is not an option as funding is rarely available. **Generator operators are often hampered by the fact that they are paid on credit, so they rarely have the cash available to improve their systems or carry out repairs quickly and efficiently.** One operator in Kakuma 1 explained that almost all of her customers' payments were seven months in arrears. Only very few generator operators are able to reserve a maintenance fund to pay for repairs as problems arise.



Gardeners in Kakuma 2 rely on run-off from the community water collection points to water their crops. Photo: Roland Kalamo

Meanwhile, **the water system operated by the NRC is making progress shifting to solar-powered pumps.**

Aside from reflecting the agency's adherence to international environmental sustainability and climate change mitigation goals, the solar-powered pumps save a tremendous amount of money on fuel.¹² However, individual refugee generator operators are unlikely to have the access to capital or solar technologies that large agencies enjoy. The informal sector has therefore not made any substantial transitions to renewable or more fuel efficient methods of electricity generation.

Occasionally an external non-profit or social enterprise distributes a new cooking or solar energy technology to camp residents, usually as part of a pilot project and often only as a one-off occurrence. Attempts to transition from firewood and charcoal-based cooking methods to renewables have not been sustained. However, Kenya has been selected as one of the pilot countries for the UNHCR's Safe Access to Fuel and Energy programme (SAFE) and has developed a comprehensive strategy to provide refugees with greater access to sustainable energy.¹³

Livelihoods development

The formal versus informal nature of camp infrastructure also reflects the dilemma between the priorities of rights-based protection and market-based livelihood facilitation. Under UNHCR's protection mandate, water is treated as a survival need that must be provided free of charge. With the exception of cooking fuel and street lights, most energy needs are not treated as protection concerns, and so they are only available on a for-profit basis from the informal sector.

Free distribution of goods is imperative where vulnerable populations are concerned, but market-based systems tend to provide a better means of supplying livelihoods. One reason is that formal provision under the protection mandate is usually undertaken on a per capita basis. UNHCR provides water at a minimum of 20

litres of water per person per day. But beyond this minimum, nothing is provided. As a Burundian farmer explained:

“The GTZ people told us they can give us crops but not water. The agency providing water told us we are here to provide water for home usage, not water for your garden. This negatively affected our cultivation.”

Here, for-profit provision of resources has its advantages. The informal trade in energy resources such as electricity, firewood and charcoal allows businesses to purchase the goods they need in the quantities that they need. Restaurants require large quantities of water for cooking and washing, which they can acquire from Turkana porters. Businesses and households can pay for as much electricity as they need, from a single light bulb to multiple refrigeration units.

The informal resource market can also provide specific kinds of products according to the consumer’s needs. A baker with whom we spoke uses a large earthen oven and a giant cast-iron vat to produce breads, biscuits, cakes and several confectionaries such as halwa consumed by the Somali community. To fuel these technologies he requires large pieces of firewood, far bigger than what is provided as rations by Lokado. Through the informal market, he is able to find what he needs from Turkana women selling locally gathered firewood in the camp.

However, **some forms of energy should still be provided on a protection basis.** Cooking fuel in Kakuma provides a case in point. Without formal provision, those with sufficient funds can purchase firewood from Turkana women, but those with lesser means are forced to collect firewood outside the camp. This puts poorer people – especially women – at risk of confrontations with local Turkana residents protecting their own resources and livelihoods. Lokado does distribute small monthly rations of firewood based on the

number of people in a given household, often about 5kg per person per month, but the quantity is inadequate for most families. People are therefore forced to procure additional fuel elsewhere, and conflicts with the host community continue.

Upgrading infrastructure: considerations for refugee livelihoods

The informal sector’s successes are celebrated as demonstrations of refugee ingenuity, evidence of people’s capacity to overcome inadequacies in humanitarian resource provision. The lesson is that people should be empowered and their endeavours facilitated, rather than stifling their initiative and innovation under conventional top-down aid models. But while the networks of energy provision that have emerged across Kakuma’s refugee camps have overcome institutional shortcomings, what is the best way forward? Can this informal system be built upon and improved in partnership with formal institutions, or does the increasing recognition of access to energy as a right require a more transformational overhaul of the current infrastructure system?

One way to approach these questions is to consider the winners and losers of different scenarios. Many refugees have made businesses out of energy provision, and **any plans to roll out more comprehensive energy infrastructure must consider how it will affect current providers’ livelihoods.** If entrepreneurs are highly dependent on the profits they derive from electricity provision, then any formal system of electricity might undermine their livelihoods, and the benefits to the camp population at large should be weighed against losses incurred by current generator operators.

However, while more comprehensive quantitative assessments are necessary, our preliminary findings were



A view of the Kakuma 4 area of Kakuma refugee camp. Photo: UNHCR/Will Swanson

striking in that **most of the 10 electricity providers we interviewed in Kakuma did not view their businesses as a major source of profit:**

"We are not getting a huge benefit from the business... For example, the generator that we use for business and our daily life consumes around 20 litres of fuel per day, and it's around 2000 KSh per litre. And also it's a machine; it needs oil and spare parts for repair. So you can compare what you can get and what you invest in order to run your business."

Kenya Power, the primary electrical distributor in most of the country, is currently building a small power station outside Kakuma to provide electricity to the town. Just like in the camp, Kenyan businesses in town currently rely on generators, which usually run from about 5pm to 11pm before shutting down for the night. While there has been no official move to extend power to the camp, this hypothetical situation provided a useful scenario for interviews. Most refugees – including those operating generators in the camp – expressed doubt that Kenya Power would ever provide energy to the refugee community. But interestingly, many operators were open to – and even enthusiastic about – the prospects of being rendered obsolete. A generator operator in Kakuma 1 explained:

"For me [service from Kenya Power] is good because it means less expense to me. Beside electricity, I also provide dish service (DSTV). If Kenya Power comes, there is no need of fetching water for the cooling tank or paying for fuel and maintenance because the generator is no longer necessary."

Many generator owners described their work as a business, but they emphasised social obligation to their neighbours rather than a profit motive. As one provider in Kakuma 2 explained:

"Before I brought my generator here, there was a real need for power in Kakuma 2. I brought for them this generator and now they are happy and comfortable with access to this electricity. I am getting some advantage at the same time by offering the community what they need. So if they get something which is better than my generator, I don't see it as negative."

For many of these operators, their businesses are not profiting due to frequent breakdowns, high maintenance costs, and the inability of many customers to pay on time, in which case they would often receive electricity on credit. It seems that if there is a personal benefit, it is prestige and appreciation from the community, as well as access to energy for other businesses, such as cinemas and restaurants. Owning your own generator makes many other business activities easier because you control the hours that the generator is operating. This suggests that more comprehensive camp energy infrastructure – with greater reliability and longer service hours – would support livelihoods and growth among the population more broadly.

However, several energy providers did express concern over the idea of service from Kenya Power. These were usually entrepreneurs operating larger, more efficient generators with over a hundred customers. The high number of customers, as well as a larger proportion of business-owners among the customer base who can pay for their energy use on time, allowed generator owners to operate more profitably. These **higher-end energy providers might suffer economically if rendered obsolete by the introduction of large-scale energy infrastructure**. The dilemma is therefore between providing energy for livelihoods versus providing energy as a livelihood.

Upgrading infrastructure: considerations for the host community

Aside from electricity, there has also been interest in upgrading refugees' cooking methods to utilise Turkana County's abundant sunlight. Solar Cookers International and various other manufacturers of **renewable-based stoves** have been piloting their equipment in Kakuma for over a decade. Based on interviews with three international organisations, these ad hoc projects do not appear to take priority for camp management, are left relatively uncoordinated with one another, and lack long-term funding. Nonetheless, renewed institutional interest in camp energy technologies – as expressed through both the Moving Energy Initiative and UNHCR's SAFE strategy – suggests that **substantial transformation of Kakuma's energy sector could be on the horizon**.

Such initiatives are often promoted as ways of **bridging humanitarian and development priorities**, and thereby bringing together the interests of the host and refugee communities. Indeed, everyone with whom we spoke in Kakuma town recognized the refugee camp as a crucial part of the local economy without which Kakuma town would wither into a mere highway outpost between Lodwar and Lokicogio. New energy technologies could entail job opportunities in installation, maintenance and repair for those with adequate training, and improved energy access would help to diversify the economy, benefiting both refugee and host community members engaged in business and trade.

But **it is necessary to recognise how dramatically different the interests of different segments of the host community may be**. For instance, business-oriented entrepreneurs in town constitute just a small section of the host community. Most people in this area would identify as ng'iraiya (local Turkana herders) or ng'ikebotok (poor former herders who have moved to town after suffering major livestock losses). Many of these people also recognise the camp as a crucial economic resource, in which they seek employment carrying water, selling raw resources from the local environs, and carrying out household tasks such as washing and cooking. But rather than bringing new

	Customers	Generators & turbines	Profits	Position toward Kenya Power
Small-scale providers	<100	Large, petrol	Marginal	Welcoming
Large-scale providers	>100	Small, diesel	Substantial	Concerned / opposed

opportunities, the widespread introduction of solar cookers would presumably decrease demand for some of the main products sold by the Turkana community: firewood and charcoal.

Already, in a recently established refugee settlement at Kalobeyei, Turkana people are expressing frustration at the lack of a market for cooking fuel among the new arrivals. Many of the refugees settled at the new site hail from poor communities in South Sudan and are familiar with environments similar to Turkana. They therefore collect their own firewood, removing any need for economic interaction with local Turkana people. There had not yet been any conflicts at the time of research, but Turkana interviewees warned that similar conditions in the past had resulted in violent confrontations.

It is possible that new livelihood opportunities for local Turkana could arise out of the introduction of renewable energy infrastructure in Kakuma, but it is difficult to predict what the long-term changes will entail. In the short term, **it may be best to incorporate people's current economic activities into new energy agendas.** For example, the Food and Agriculture Organization (FAO) is working on a project to improve the efficiency and reduce the environmental impact of charcoal burning techniques among Turkana people around Kakuma. By ensuring that Turkana people remain included in Kakuma's energy economy, camp officials could ensure that this segment of the host community is not sidelined by new infrastructural developments.

Conclusion

This brief report touches on just a few of the general findings from research in Kakuma. In broad strokes, it highlights the importance of hybridity between formal and informal systems of resource provision, as well as the complex social relationships involved. Further research in Kakuma and elsewhere is required to understand how the provision of water, energy, and other services can best support both the protection of vulnerable populations and the livelihoods of those pursuing greater self-reliance.

In Kakuma refugee camps, institutional attention has long focused on water as a basic household service, and energy provision is generally left for refugees and the local markets to supply for themselves. The organisations involved in the recent Moving Energy Initiative have identified energy provision to displaced populations – previously limited to cooking fuel, school lighting, and heat in cold locations – as a target for humanitarian and private sector cooperation and a crucial requirement for sustainable refugee livelihoods. However, the success of formal energy projects depends on a detailed understanding of the informal structures and relationships that complement international interventions, an issue requiring greater attention from both researchers and practitioners.

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