Research Paper

Raffaella Bellanca

Energy, Environment and Resources | December 2014

Sustainable Energy Provision Among Displaced Populations: Policy and Practice

CHATHAM HOUSE
The Royal Institute of International Affairs

Contents

Summary

By the end of 2013, 51.2 million individuals were forcibly displaced worldwide as a result of persecution, conflict, generalized violence or human rights violations, reaching levels unseen for the past 20 years (UNHCR, 2013). The humanitarian response to this sizeable challenge must be to increase funding but also to contain costs and to maintain or to improve operations' standards. The scaling up of sustainable energy solutions, by increasing efficiency and 'greening' procurement and project implementation, has the potential to contribute to the achievement of these objectives.

During the past two decades, energy issues have steadily been incorporated into global humanitarian responses. Initially they were considered as a corollary of environmental concern but they soon started to figure as part of protection strategies. More recent efforts have examined market dynamics and innovation patterns of energy in displaced populations and humanitarian operators' camps. Although energy does not yet have an institutional presence within the Inter-Agency Standing Committee (IASC) Clusters Leads system, the creation of the Safe Access to Fuel and Energy (SAFE) initiative has signalled a turning point by catalysing the participation of many UN agencies and NGOs in energy issues. While the SAFE coalition chiefly seeks to address energy access, other trends have been emerging in recent years that focus on how best to 'green' procurement and operations in the UN. Available examples come mainly from the experiences of peacekeeping forces.

This study has used examples of field projects implemented by both not-for-profit actors and the private sector to identify progress and persistent weaknesses. A first consideration emerging from the cases analysed is that the implementation of energy projects requires specific capacity and expertise but that very few organizations can afford to employ personnel with an energy background dedicated to the issue. Also, coordination among relief actors and with local authorities on the ground appears to lack a robust structure. Moreover, preliminary observations suggest that the current focus of interventions, implemented by humanitarian agencies and their partners, is mostly based on meeting energy needs via the distribution of products. This approach seems narrow because satisfying energy demands often requires consideration of value chains both in the surrounding environment and in the socio-cultural context (the energy delivery model).

The distribution paradigm leads to a number of negative indirect impacts, including market disruption, the reselling of products, a top-down approach addressing needs with products from unsustainable value chains, tensions with hosting communities and, in protracted situations, the creation of a receiving mindset among beneficiaries (dependency syndrome). In contrast, experiences from market-led solutions (e.g. pay-as-you-go (PAYG) solar, micro-enterprising, cash aid, cash for work and outsourcing labour from camps) appear to offer a stronger basis for sustainability. But relief agencies seem reluctant, and often face constraints (ranging from a lack of customers' purchasing power to adverse government regulations), to engage and support the development of market dynamics in their projects.

Some of the drawbacks encountered in the field are linked to the absence of an institutionalized presence for energy in humanitarian responses. First, energy funding is not automatically budgeted in relief operations; it generally comes from ad hoc projects or as part of bigger programmes. Secondly,

no particular agency has the mandate to advocate for energy interventions or the responsibility to ensure their success. In addition, reporting formats focused on other priorities, and lack of energy indicators, make it difficult to measure the sustainability of energy activities and thus to improve their outcomes. The SAFE initiative is working to ensure an energy reference point in humanitarian responses.

Other issues emerging from the field – such as the preference for distributing products rather than robust market-based approaches towards products and services, weak interaction with the private sector, typically short-term humanitarian funding mechanisms and the disconnect between humanitarian and development budget lines – appear to be linked to humanitarian agencies' operational structures. Innovative trends in the humanitarian system could offer opportunities to tackle these challenges. For example, the ongoing reform process of the management and reporting system could be influenced to include information that measures the impacts of sustainable energy adoption. Also, the upscaling of innovations such as cash grants, could, with the right support from government and camp managers, pave the way to a flourishing ecosystem of micro-energy enterprises in camps. Further innovation efforts will be needed in order to increase collaboration with the private sector and to encourage the adoption of market-like operational models.

Introduction

The number of forcibly displaced persons worldwide is expected to grow owing to the likely impact of climate change and to growing tensions among ever-larger populations competing for limited resources (IPCC, 2014). The humanitarian response should be able to expand its resources and to increase its preparedness for facing the growing challenges that will emerge. Reducing operational costs will become increasingly important. At the same time, the struggle to continuously improve the quality of life for affected people and to mitigate the harmful impact of humanitarian settings on host communities and countries remains a central aim.

Focusing on energy services has the potential to help achieve these goals, by meeting the needs of humanitarian operators in a more efficient and cost-effective way and by offering greater access to energy opportunities for beneficiaries.

Some steps are being taken – energy issues are now more often and more consistently included in projects and programmes – but there are still gaps to be addressed. The SE4All initiative[1] and the SDG framework[2] discussions are bringing greater focus on energy access; and in view of the 2016 Humanitarian Summit, there is potentially an opportunity to move the agenda forward.

This report attempts to examine the factors that are inhibiting system-wide changes and the diffused uptake of sustainable energy solutions. The methodology of this study is outlined in Chapter 2. Chapter 3 explores the network of actors and initiatives present on the scene, and looks at their principal motives to action and efforts to date. This exercise reveals that a comprehensive approach to cover energy needs in humanitarian response is still some distance away and indicates where more attention could be devoted. Examples of projects on the ground are then employed in Chapter 4 to expose weaknesses affecting the sector, while promising and particularly innovative models are also highlighted. Chapter 5 seeks to identify underlying mechanisms causing the challenges encountered in the case studies. Findings are then discussed in the conclusions presented in Chapter 6.

[1] The Sustainable Energy for All initiative was launched by UN Secretary-General Ban Ki-moon in September 2011. It has the objectives of providing universal access to modern energy services, doubling the global rate of improvement in energy efficiency and doubling the share of renewable energy in the global energy mix. For more information, visit the SE4ALL website at www.se4all.org/.
[2] For more information on the Sustainable Development Goals, visit the website at http://sustainabledevelopment.un.org/index.html.

Methodology

The focus of this study is relief-camp settings in situations of natural disaster or insecurity. While displaced people are often dispersed among host populations, these situations have not been discussed. Interviews were conducted between July and September 2014, particularly in Haiti but also internationally, whether by phone, in person or by written exchanges. The background of interviewees ranges from UN staff to NGOs, local government officials, private actors, academics and end-users. A list of interviewees and their affiliation is provided at the end of the report. In addition, input was provided by several actors from the humanitarian and private sectors at a workshop in London at the beginning of September. Many findings were also drawn from a review of the literature and, where possible, from site visits, particularly for the case studies. Owing to limited access to key persons, the collection of information has been a constraint upon this research. Thus at times, inferences are based on informed hypotheses rather than robust evidence.

Historical Developments and Trends

Summary points

- During the past two decades, energy issues have been steadily incorporated into the global humanitarian response. The initial main entry point for energy has been the environmental agenda.
- Over time, the focus of humanitarian agencies on beneficiaries' well-being has strongly influenced the way energy issues are tackled, making their inclusion in relief response the consequence of protection concerns.
- The Inter-Agency Standing Committee (IASC) task force on safe fuel and energy (SAFE) has catalysed the participation of many UN agencies and NGOs in energy issues.
- More recently, organizations have started to explore the market dynamics of energy and patterns of innovation in emergency situations.
- Much of the literature looks at the energy needs of beneficiaries and limited attention is devoted to operators' compounds. Peacekeeping forces are an exception in the UN system, where considerable efforts have been made in recent years to achieve more consistently sustainable solutions.

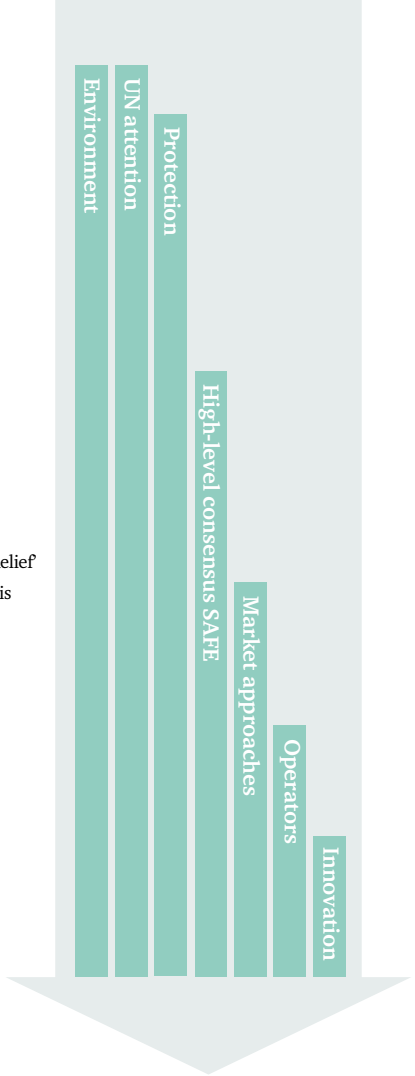
It is interesting to see how in 1995, when the 37th issue of the journal *Boiling Point*, on 'Household energy in emergency situations' (ITDG, 1996), was published, awareness of energy issues related to camp set-up and the harmful overuse of firewood for cooking was already widespread among energy practitioners. The issue gave recommendations to be followed in camps that are still valid, including early planning for energy needs, fuel availability assessments, energy conservation (lids, wood drying and heat-storage cookers), stoves and reforestation. The Cookit stove had just been introduced in Kakuma by Solar Cookers International. The United Nations High Commissioner for Refugees (UNHCR) and the International Federation of Red Cross and Red Crescent Societies (IFRC) discussed a project in Burundi where they aimed to ensure fuel supply and to minimize environmental damage. A Stove Checklist for Refugee Situations was also included that looked very similar to ones that would follow in later years.

This early publication shows that the matter is not new but also clearly points to important differences between now and then. First, energy issues seemed to be addressed on a project basis, with scattered and isolated interventions. Secondly, technologies, and especially renewable energy solutions, have been advancing substantially, realizing much lower implementation costs and proven outcomes.

Figure 1 lists chronologically the main events relevant to energy in emergency situations that have occurred since 1995. This summary does not aim to be exhaustive but it does show that policies and practices have emerged over time among organizations with different focuses and priorities. The figure shows gradual developments (from the engagement of UN agencies to the creation of the SAFE initiative) and trends (from a focus on the environment to the acquisition of a protection perspective to the latest attention to sustainability), as illustrated in the following sections.

Figure 1: Chronological summary of events relevant to energy in emergency situations, 1995–2014

1995	*Boiling Point,* Issue 37. 'Household Energy in Emergency Situations', Stove Checklist for Refugee Situations
1995–ongoing	UNHCR, Environment Unit
1996–2005	UNHCR, Environmental Guidelines
1997–2011	Red Cross and Red Crescent, The Sphere Project and Handbook (2004)
1998	UNHCR, Environmental Guidelines: Domestic Energy in Refugee Situations
2001–2009	UNHCR, FRAME Toolkit
2002	UNHCR, Cooking Options in Refugee Situations
2002–2008	NRC, Camp Management Project: Toolkit
2005	UNHCR, Forest Management in Refugee and Returnee Situations
2005	IASC, Clusters creation
2006	WRC, Fuel and Firewood Initiative: Beyond Firewood
2007	IASC (UNHCR, WFP, WRC) SAFE
2007	UNHCR, Handbook for Emergencies
2009	SAFE Matrix, SAFE Decision Tree Diagrams
2009–ongoing	IUCN, IES, FUEL project
2010	*Boiling Point*, Issue 59. 'Energy in Conflict and Emergency Relief'
2010	PA, IRC, EMMA Emergency Market Mapping and Analysis Toolkit
2010	USAID, Fuel-Efficient Stove Programs in Humanitarian Settings: An Implementer's Toolkit
2011	UNHCR, Light Years Ahead
2011	UNIFIL, State of Environment
2012	WFP, Handbook on SAFE
2012	UNEP (Post Conflict and Disaster Management Branch), Greening the blue helmets
2012	Humanitarian Innovation Project
2013	FAO in Emergencies. Guidance Note
2014	GACC, Strategy for SAFE
2014	UNHCR, Global Strategy forSAFE
2014	UNHCR Energy Lab



Energy as a corollary of environmental issues

In 1995, the UNHCR established the Environment Unit. In 1996, it published the *UNHCR Environmental Guidelines* (UNHCR, latest edition 2005), reflecting the advance of the environmental agenda in the UN system. In it, domestic energy is referred to as a corollary of the environment. A subsequent, more energy-focused technical guideline, *Environmental Guidelines: Domestic Energy in Refugee Situations* (UNHCR, 1998), gives a comprehensive view of energy issues in camps, looking at needs, sources and available technologies. It is not restricted to cooking, and includes a small section on agencies' needs as well as those of beneficiaries. Various best practices for domestic energy were documented in a further UNHCR booklet, *Refugee Operations and Environmental Management: Selected Lessons Learned* (UNHCR, 1998; latest edition 2002).

As part of a series of environmental manuals for use in refugee situations, designed for UNHCR programme technical staff and implementing partners, the UNHCR produced a guide on *Cooking Options in Refugee Situations: A Handbook of Experiences in Energy Conservation and Alternative Fuels* (UNHCR, 2002) and another one related to fuel issues, *Forest Management in Refugee and Returnee*

Situations: A Handbook of Sound Practices (UNHCR, 2005). Continuing its commitment to look at environmental issues and to ensure that environmental assessments, monitoring and evaluations are carried out in a more systematic manner and with appropriate means and approaches, in 2001 the UNHCR initiated the FRAME project, the Framework for Assessing, Monitoring and Evaluating the Environment in Refugee-related Operations (UNHCR and CARE International, 2009a). The project was designed specifically to develop, test and deliver a series of tools to a wide range of users, primarily UNHCR managers and field staff but also to implementing partners, government authorities and others.

Another coalition that approaches energy from the environmental perspective is the FUEL project (IES, 2009), a diplomacy and education project set up to integrate energy needs into humanitarian crisis responses and giving a focus on household fuel. It aims to enhance the policies and practices of (Dutch) humanitarian aid organizations and to encourage policy-makers in the Netherlands to put the issue higher on their agenda. The FUEL project started off with a survey of policies and best practices of humanitarian organizations and potential alternative energy sources and technologies (Van Dorp, 2009). Recommendations elaborated by the FUEL project include mainstreaming the consideration of ecosystem impacts from the planning stage; avoiding future aid expenses (due to damage to soil, water etc.); including local conflict analysis and 'do-no-harm' assessments before implementing fuel-related projects; giving environmental security the same weight as food security; making use of existing policies to move to implementation by including fuel in budgets; building staff capacity; and coordinating among humanitarian organizations.

Energy in camp-management toolkits

By the mid-2000s, environmental concerns began to enter camp-management toolkits. In 2004, The *Sphere Handbook* (Red Cross and Red Crescent 2004, latest edition 2011) was published by the Sphere Project, an initiative launched in 1997 by the Red Cross and Red Crescent movement in an effort to improve the quality of assistance provided to people affected by disaster and to enhance the accountability of the humanitarian system in disaster response. More than 400 organizations in 80 countries have contributed to this project. Sphere's philosophy puts the right of disaster-affected populations to life with dignity and to protection and assistance at the centre of humanitarian action. Four key areas are considered: water and sanitation, food, shelter and health. The environment, and energy within it, is included as a cross-cutting issue.

The UNHCR followed in 2007 with the *Handbook for Emergencies: Third Edition* (UNHCR, 2007a). A third, similar publication, the *Camp Management Toolkit* (NRC, 2008), was released by a group of organizations (including the DRC, IRC, UNHCR, UNOCHA and IOM) under the coordination of the Norwegian Refugee Council. Since its publication, the *Toolkit* has been actively used in the field. It defines key messages and issues in relation to the roles and responsibilities of camp-management agencies and provides practical advice for camp-management staff.

In these documents, energy issues are considered only briefly and always as part of other concerns. The *Camp Management Toolkit* mentions wood collection and seedling production as well as sustainable fuel sources, and it looks at 'ecological' stoves as part of non-food items. The *Sphere Handbook* refers to improved cookstoves (ICSs), which are mentioned several times and are covered from every angle. In Chapter 11 (on a community-based approach and community services), cookstoves are identified as a livelihood opportunity; Chapter 12 (site selection, planning and shelter) looks at fuel-efficient techniques for cooking, including stoves;

Chapter 14 (water) mentions environmentally friendly stoves for boiling water; Chapter 15 (on sanitation and hygiene) mentions ICSs, to reduce smoke; and Chapter 16 (food and nutrition) has a paragraph on food-cooking that mentions stoves. For the first time, the protection perspective makes its appearance side by side with environmental concerns. In Chapter 18 (on the prevention of and response to sexual and gender-based violence in emergencies), it mentions solar lighting in communal areas and torches for families.

IASC and SAFE: energy from a protection perspective

An important step in the humanitarian sector with repercussions for energy too was the establishment in 1992 of the Inter-Agency Standing Committee (UN, 1992). This became the major coordination mechanism for humanitarian aid, consisting of UN agencies and the major international humanitarian NGO consortia. In 2005, IASC designated global 'Cluster Leads' (IASC, 2005; latest 2012) specifically for humanitarian emergencies in nine sectors, including camp coordination/management, agriculture, health, logistics and protection. The cluster approach aims to improve the predictability, timeliness and effectiveness of humanitarian responses and to pave the way for recovery. It also aims to strengthen leadership and accountability in certain key sectors. But within the cluster approach, there is no fuel or energy cluster; and thus, once more, any fuel-related programming is necessarily dealt with indirectly as part of other aspects. There are six cross-cutting issues; of them, the closest to energy is the environment. So far, the environment has received fewer resources than other cross-cutting themes such as gender (Van Dorp, 2009).

In 2007, three organizations within IASC, namely the UNHCR, the WFP and the WRC, launched the Task Force on Safe Access to Firewood and Alternative Energy in Humanitarian Settings (SAFE). In 2009, the initiative published the *Matrix on Agency Roles and Responsibilities for Ensuring a Coordinated, Multi-Sectoral Fuel Strategy in Humanitarian Settings* (IASC Task Force SAFE, 2009a). The Matrix is targeted at field-based actors from a range of humanitarian response sectors, including camp management, shelter, environment, livelihood/food and protection. It defines the key household energy-related activities that pertain to each of the eight issue areas and tasks key agencies with ultimate responsibility for ensuring that the listed activities are implemented. The importance of the Matrix is that it presents, for the first time, a clear framework for cross-sectoral coordination of fuel-related activities in the context of emergencies. Complementing this publication, SAFE also released the *Decision Tree Diagrams on Factors Affecting Choice of Fuel Strategy in Humanitarian Settings* (IASC Task Force SAFE, 2009b). The diagrams serve as guidelines for decision-making on fuel-related needs in the field, in both acute emergencies and protracted emergencies.

A number of publications released by members of the SAFE Steering Committee have followed. In 2014, UNHCR published the *Global Strategy for Safe Access to Fuel and Energy (SAFE): A UNHCR Strategy, 2014–2018* (UNHCR, 2014a). This document aims to enable refugees and other persons of concern to meet their energy needs in a safe and sustainable way. It focuses in particular on energy needs for lighting at night and cooking, and aims to provide a cross-sectoral approach to energy planning by addressing security, nutrition, health, environment, livelihood and education.

From the protection perspective, UNHCR launched the five-year *Light Years Ahead: Innovative Technology for Better Refugee Protection* (UNHCR, 2011) campaign. It focuses on providing innovative technology for better refugee protection and aims to raise funds to improve the basic cooking and lighting needs of more than 450,000 refugees in seven African countries.

Another effort under SAFE from the WRC is the Fuel and Firewood Initiative, started in 2006. Its aim is to investigate methods for reducing the vulnerability of displaced women and girls to gender-based violence during the collection of firewood. This work led to the publication of the report *Beyond Firewood: Fuel Alternatives and Protection Strategies for Displaced Women and Girls* (WRC, 2006). In the subsequent years, the WFP published the *Handbook on Safe Access to Firewood and Alternative Energy* (WFP, 2012), to guide programming. The WFP approach understandably comes from a food perspective and tackles issues such as improving assistance outcomes; long-term food security; beneficiaries' safety, dignity, health and livelihoods; women's vulnerability to gender-based violence; and the environment. The handbook also looks at school meals programmes, to which UNICEF and WFP have a strong commitment. Similarly, the FAO released a guidance note in 2013 (FAO, 2013) defining the principles underpinning its engagement in SAFE-type interventions. These include the sustainable use of natural resources, protection and the 'do-no-harm' principle, special attention to women and children and a holistic, multi-sectoral approach and partnership. The guidance note also presents immediate and medium-to-long-term actions for including cooking fuel responses in emergency and rehabilitation work and provides a practical checklist to help staff and partners. A specific element of the FAO's SAFE approach is the emphasis on integrated food energy systems.

More organizations are regularly joining the SAFE initiative. One of them is the Global Alliance for Clean Cookstoves (GACC), which joined in 2010 and is now preparing for the second phase of its involvement. The strategy document that GACC has published, *Humanitarian Engagement: Safe Access to Fuel and Energy (SAFE) in Emergencies* (2014), emphasizes that SAFE does not only include cookstoves and fuel, but also lighting and heating and embraces broader behavioural and market-based approaches during the transition phase from emergency response to durable solutions. The SAFE initiative also includes NGOs such as the International Lifeline Fund, focused on cooking and water, and Mercy Corps.

Markets, innovation and operators' compounds

The SAFE initiative is perhaps the most successful in attracting consensus and gaining agencies' support for the energy agenda, but other initiatives are also actively contributing to this field through other entry points that include energy needs.

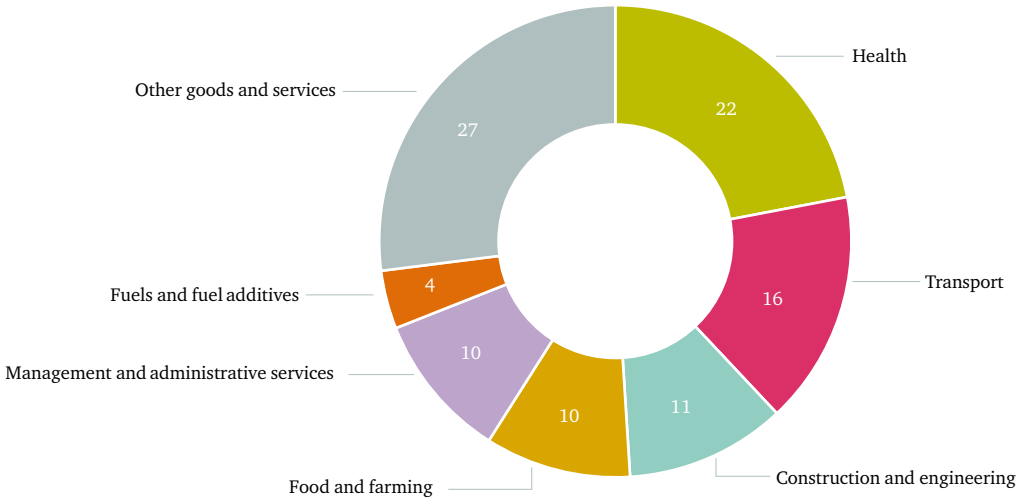
From a market dynamics perspective, the EMMA consortium has published the 'EMMA Emergency Market Mapping and Analysis Toolkit' (EMMA, 2009), a guidance manual and approach developed by Practical Action and the IRC for relief agencies needing to understand market systems in disaster zones. It enables the smarter use of local economic capabilities to improve humanitarian responses. For example, an article in *Boiling Point*, Issue 59 (Hedon, 2010) reports on the application of the EMMA toolkit to explore programme options for meeting firewood and fuel needs in Jalozai camp, near Peshawar in Pakistan.

In the area of enterprise and innovation, it is interesting to point out the work of the Humanitarian Innovation Project (HIP, 2012), a research project based at the Refugee Studies Centre, University of Oxford and launched in 2012. Its initial focus is on refugee livelihoods innovation, examining ways in which refugees' own skills, aspirations and entrepreneurship are used to develop market-based solutions to refugee protection and assistance. Cooperating with the UNHCR, this project aims at documenting and researching actual and potential market-based solutions. Although not exclusively focused on energy, it

could shed light on dynamics that are crucial to the more systematic, and sustainable, inclusion of energy in the lives of camp populations. Useful research in this field can be found in several papers, for example 'Entrepreneurship and Innovation: How Institutional Voids Shape Economic Opportunities in Refugee Camps' (De la Chaux and Haugh, 2014). This looks at ways in which entrepreneurial activities are taking place in camps, their importance and how to enable their broader uptake.

The meaning of the term 'energy' has evolved in the humanitarian context and has assumed different connotations. It still differs from the general concept of 'energy' and the way it is meant in the development sector. Most of the initiatives described so far look at the energy needs of beneficiaries from a household perspective, focusing mostly on cooking and lighting. However, camp settings include other aspects as well. Although the attention of humanitarian agencies necessarily focuses on beneficiaries, their needs, their safety and the impact of their activities on the surrounding environment, looking at opportunities to improve existing solutions in operators' camps could yield helpful outcomes. In fact, a look at the amount of energy consumed in emergency situations reveals that humanitarian operators, not beneficiaries, are the greatest energy consumers per capita. Lighting and cooling systems and IT and communications services all require power, and this is normally delivered by diesel generators. Moreover, camps often include institutional facilities too, such as schools and hospitals. These are also typically powered by generators. In fact, UN fuel bills constitute a sizeable part of a camp's budget, as shown in Figure 2.

Figure 2: Camp expenses by category of goods and services in the main sectors (%)



Source: United Nations Global Marketplace (2013).

These statistics also imply that from a climate change perspective, it will be important to address the emissions from operators' compounds as well as those of beneficiaries. In addition, many camp-support services outside the household sphere (for both beneficiaries and humanitarian operators) require energy, among them the production of drinking water and the management of waste. The importance of designing improved sustainable solutions to these energy needs in terms of cost, emissions and the efficient functioning of the camp cannot be understated.

The UNHCR is taking steps to address these issues, but interventions are still made on an ad hoc basis. In the Dadaab refugee camp in Kenya, for example, various solar-energy-based solutions have been piloted in offices and compounds of humanitarian agencies in order to save fuel costs:

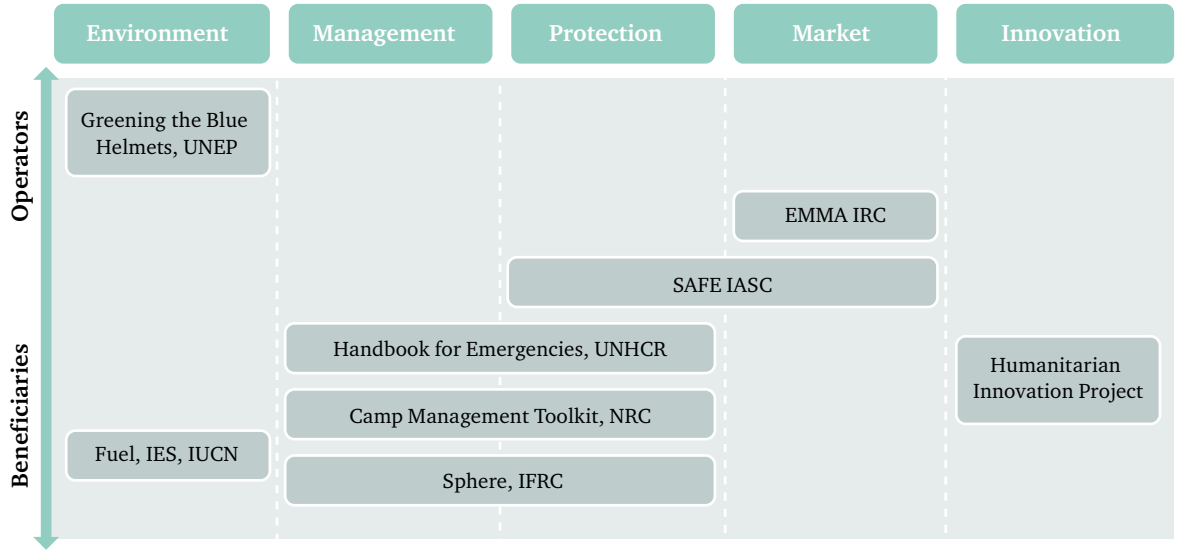
radio communications and internet connectivity are solar-powered in the Dadaab UNHCR office, as are office lighting and machine operations at the FaIDA field office in Alinjugur and the NRC field office at Dagahaley camp site, and solar-powered water chlorination dosers and pumps have been adopted in UNHCR compounds (UNHCR, 2014c).

It would also seem that even if not directly humanitarian, the work of UN peacekeeping forces in camps has extended efforts to become more resource-efficient and move towards the use of renewables. Acknowledging an environmental footprint equal to 56 per cent of the total UN greenhouse gas emissions footprint in 2008, UN Blue Helmets have since then looked to reform their operations and to address their impact. Since 2009, the Department for Peacekeeping Operations (DPKO) and the Department of Field Support (DFS) have a dedicated environmental policy for UN field missions (DPKO, 2009); it covers key areas such as waste, energy, water, hazardous substances, wild animals and plants, and cultural and historical resources management. The approach aims to bring the environment into the mainstream of all operational activities during the life-cycle of a peacekeeping operation. This work is conducted in partnership with the United Nations Environment Programme (UNEP) so as to take advantage of its long-term expertise in the field.

UNEP's Disasters and Conflicts Sub-Programme (UNEP, 1999), initiated in 1999, works to understand and to reduce the impacts of environmental degradation from disasters and conflicts on human health, livelihoods and security. It also emphasizes the role of healthy ecosystems and sustainably managed resources in reducing the risk of disasters and conflicts. In 2012, it published *Greening the Blue Helmets: Environment, Natural Resources and UN Peacekeeping Operations* (UNEP, 2012), a report looking at solutions to decrease the environmental impact of peacekeeping forces.

Other concrete efforts to 'green' the operations of peacekeeping forces are ongoing. The Engineering Standardization and Design Centre at the UN logistics base in Brindisi, Italy looks at innovation and improvements to UN stocks of materials. For instance, its 2013 newsletter includes an article on 'Modularization: Exploring Alternative Options for Sustainable Power Supply in UN Camps' (ESDC, 2013) under the modularization section, which looks at various renewable-energy solutions for reducing the use of diesel in camps.

Figure 3: Trends and agencies



Individual units of UN peacekeeping forces are also developing their own strategies. Thus UNIFIL[3] has produced an environmental strategy based on the DPKO/DFS Environmental Policy for UN Field Missions and has issued its own environmental guidelines and action plan. This plan describes in detail the mission's short, medium- and long-term environmental objectives, specifying activities and assigning responsibilities. The report *State of Environment in UNIFIL Area of Operations Year 2011* (UNIFIL, 2011) mentions several activities, including energy-saving campaigns and the installation of PV systems.

Figure 3, mapping the range of organizations and initiatives presented above, illustrates the agencies' main interests and divides them according to their focus on beneficiaries or operators. It will be seen that there is very little overlap between organizations focusing on the two groups. This indicates an enduring divide in the way in which the energy needs of the two groups are addressed. For example, camp set-up guidelines for the two categories could follow distinct prescriptions, be subjected to different financing mechanisms and procurement rules and be motivated by different goals.

Moreover, it is evident that energy needs are generally considered not *per se* but in relation to other issues. Some agencies are preoccupied with the protection and well-being of beneficiaries; some look chiefly at the environmental impact of camps on surrounding areas; others focus on markets or innovations; and still others look at the efficiency, footprint and cost optimization of operators' compounds (although mainly for peacekeeping forces).

The latest trends, such as the opening of an Energy Lab by UNHCR's innovation and energy and environment units, testify that this gap is recognized and is beginning to be addressed. The Energy Lab is a joint venture aimed at developing and implementing innovative approaches to solve the holistic energy challenges facing refugees.

[3] See UNIFIL website at http://unifil.unmissions.org/.

Challenges on the Ground

Summary points

A look at what happens on the ground is useful for identifying the main challenges obstructing sustainable energy solutions.

- Interventions focus mostly on energy products rather than energy services. The provision of services distinguishes itself from the distribution of products in that it requires the design of delivery models concentrating on the value chain and its surrounding environment.
- Distribution is the traditional way of addressing beneficiaries' needs but other approaches could be better suited for energy solutions. Negative indirect impacts from distribution include market disruption, the reselling of products, a top-down approach in addressing needs with products from foreign value chains, tensions with host communities and the creation of a dependence mindset. Cash grants and vouchers seem a promising alternative.
- Focused capacity and expertise are crucial to the implementation of energy services and to the sector's understanding of energy and the cross-cutting opportunities that it can unlock, but energy practitioners are a small minority in the personnel of implementing organizations.
- Coordination on the ground on energy initiatives both among organizations and with local authorities seems weak.

The humanitarian sector's engagement with business dynamics occurs at several levels:

- Procurement of goods and services; partnerships with not-for-profit actors to work with beneficiaries; enterprises providing services to beneficiaries; enterprises involving beneficiaries in providing services for the camps and the outside world; cash-for-work activities; and beneficiaries' micro-/small enterprises.
- Microbusinesses within camps have significant potential and could be supported by the adoption of cash grants.

Sustainable energy systems, e.g. biogas, can be a holistic way in which to address several needs, e.g. sanitation, energy, waste management, agriculture etc., across several sectors, such as energy, health, WASH, nutrition etc.

Although many steps have been taken to make sustainable energy solutions a more integral part of humanitarian responses, looking in detail at the reality on the ground brings to light persistent weaknesses. It is possible to draw lessons about what works and what elements seem pivotal in determining outcomes.

The following case study has been chosen to exemplify a set of different and intersecting paths leading to project failure. It will be referred to throughout this section as a way to bring points and concepts to life.

Case study 1: Santo 17, Crois des Bouquets, Port-au-Prince, Haiti

In 2012, IOM provided more than 5,000 transitional shelters and non-food-items assistance to people affected by the 2010 earthquake in Haiti, including 358 families in the Santo 17 relocation camp. This camp was meant to be a showcase for renewables with inputs from various organizations. A biogas system was installed comprising five biodigesters fed by 60 toilets and connected to 13 communal kitchens. A mini-grid was also built, powered by five units of eight PV panels and eight batteries each. Owing to a series of shortcomings ranging from a lack of defined ownership and responsibility structures to technical failure in stove design and a poor assessment of the socio-cultural context, the biodigesters never worked properly. Similarly, street lights ceased to work in just a few months once the batteries were depleted. By contrast, some residents have since installed their own solar system and kitchen. The remaining solar gear has also been patched up with equipment from different projects and is used to power a micro mobile phone charging business.

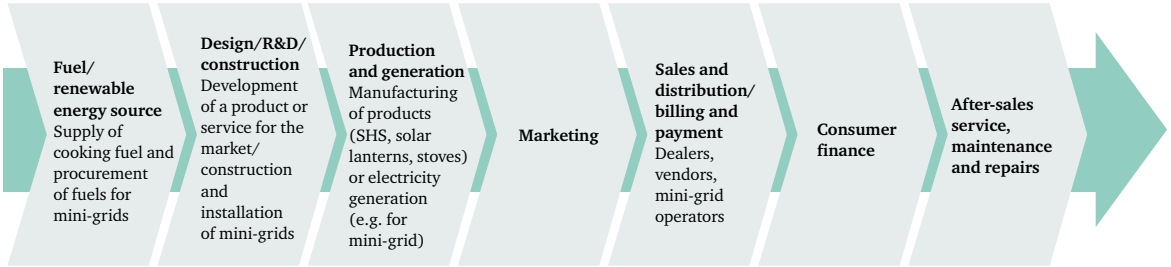
Source: See Annex A.

Products versus services

In the vast majority of energy projects implemented so far, energy needs are met by the distribution of products rather than by the provision of services. The difference between the two is fundamental. Although the energy solutions described earlier do provide access to sustainable energy, how these solutions are delivered is equally important in terms of the long-term sustainability of that energy service. In other words, 'who does what and how' along the energy value chain may determine how sustainable that energy service is. While stoves are products, cooking is an energy need met by an energy service (or energy supply system) that starts with the harvesting/extraction of the energy source or fuel. It includes each phase of energy delivery (technology design and installation, processing, distribution and marketing, management and maintenance) to the end-use, usually made possible by conversion equipment and appliances. Meeting the energy need of cooking therefore demands at least two value chains, that of the fuel, e.g. liquefied petroleum gas, charcoal, wood and ethanol, and that of the appliance, e.g. a stove, three stones.

An example of an energy value chain is shown below in Figure 4 for off-grid energy markets, including mini-grids and stand-alone products, which could be applicable to a camp setting.

Figure 4: Off-grid energy value chain

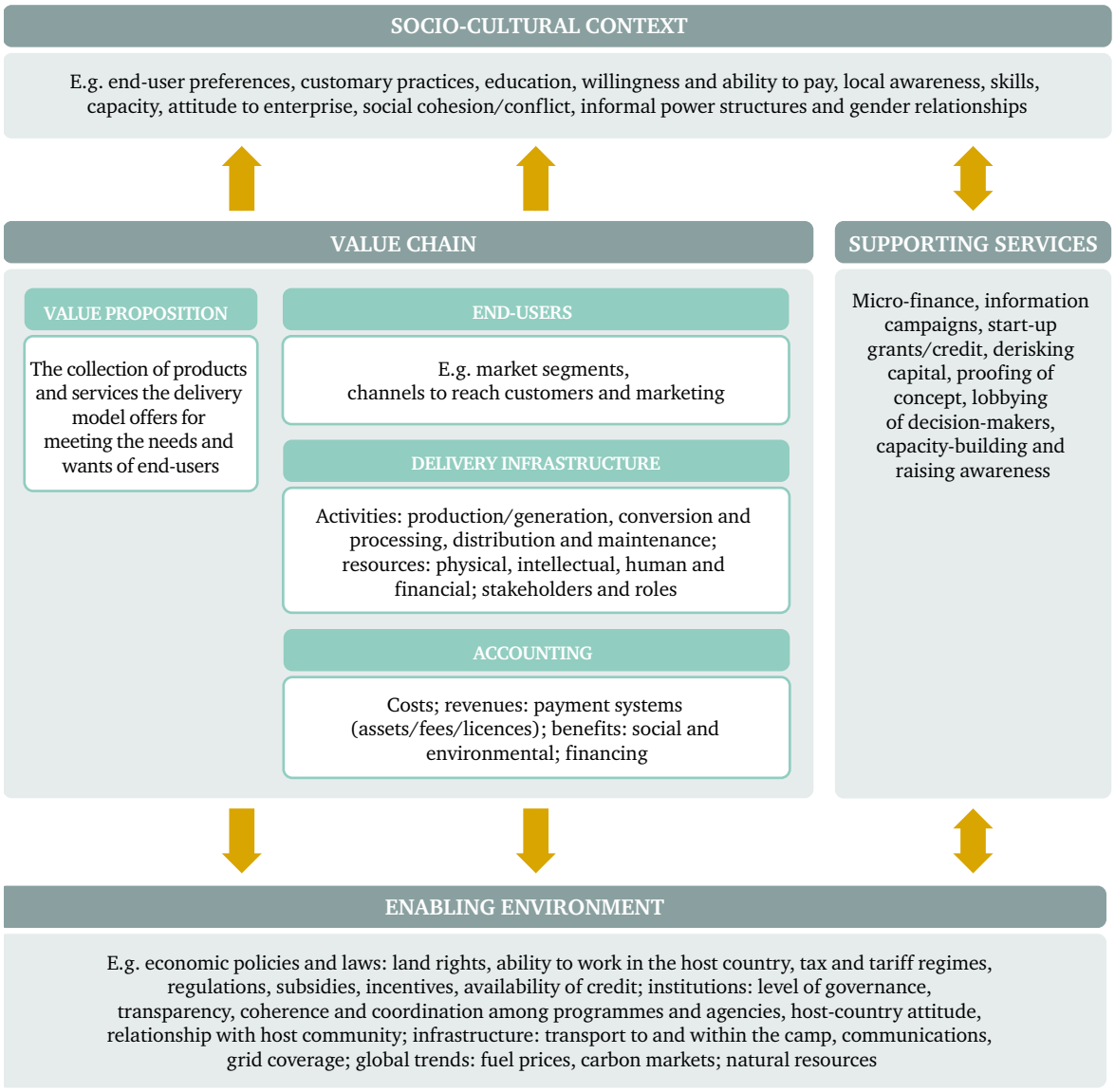


Source: Adapted from IfC.

In some cases, only a few of these roles are filled (the current model). In other cases, the same actor could fulfil many of the roles and deliver an end-to-end service. In yet other cases, there are numerous actors, each with a different role.

The combination of technology, finance, management activities, governance, legal arrangements, ownership structures, payment systems across the supply chain and types of relationship required to supply energy to people constitutes an energy delivery model (Bellanca et al., 2013; Bellanca and Garside, 2013; and Hedon, 2014). Beyond the value chain, the design of delivery models must consider the broader environment in which the service is provided, including the institutional landscape, the existing infrastructure, local capacities and the wider socio-cultural context in which end-users live and which defines their characteristics. An example of an energy delivery model map is shown in Figure 5.

Figure 5: Delivery model map



Source: Adapted from Bellanca and Garside (2013).

Designs that consider energy-delivery models are becoming increasingly common in the development sector, especially among organizations that look at value chains and market dynamics to end the cycle of poverty. Outside the camp environment, there is a growing recognition that the energy sector consists of multiple interrelated systems that collectively deliver energy supplies and appliances and use a combination of energy sources and a range of technologies (Practical Action, 2013). By varying the technologies, scale and appliances and by incorporating options on sales and consumer finance, energy-delivery models can enable access to energy for the poor, such as camp residents. Examples of energy-delivery models include a grant model, a sales model, a hire-lease model, a PAYG model and a credit model.

Which energy-delivery model is used, i.e. how energy is dealt with during the preparedness phase and the response phase, will affect the energy-delivery possibilities in the later transitional and recovery stages. A response designed for the short term is unlikely to be the most appropriate one for the longer term, such as for protracted emergencies. Not only is it likely to be unsustainable, leading to dependence, but it can also result in unsustainable practices becoming accepted, knowledge and capacity being built up and an expectation being established for, say, an expensive product.

The humanitarian sector's model of intervention is, for historical and intrinsic reasons, attuned to meeting needs with the distribution of products. This affects the way in which energy is incorporated into the humanitarian response. For example, one of the focus areas of the SAFE initiative is to include stoves and solar lamps in emergency kits. At the project level, the UNHCR report on solar energy and energy efficiency in Dadaab (UNHCR, 2014f) lists more than 33,000 solar lamps distributed from 2010 and more than 41,018 improved cookstoves distributed since 2012. In fact, most of the projects mapped by SAFE in order to examine lessons, best practices and challenges through an analysis of past cooking projects concern the free distribution of cookstoves and solar lamps. Even though approximately 40 per cent of these projects have a manufacturing component (typically for stoves), this is not implemented by business ventures, with budgets and balances, but as part of camp residents' activities financed by grants. It can therefore be considered as a 'cash-for-work' activity not directly contributing to the creation of a sustainable value chain.

It must be taken into account, of course, that these projects are still relatively new, and continuous effort is being made to move towards more comprehensive projects. For example, in the SAFE Steering Committee, market-orientated organizations such as GACC are using their expertise to examine ways of developing enterprises and economic opportunities. As an example, Potential Energy, one of GACC's Pilot Innovation Award winners, is experimenting with a stove-commercialization project in Darfur, where a revolving loan fund was set up to enable women to receive a stove in consignment and to pay with savings from charcoal. However, even the more business-orientated actors such as GACC, which encourage a broad range of responses to energy provision, have a primary focus on appliances rather than delivery models. In fact, one of its efforts is to mediate between humanitarian organizations and international companies in order to develop specifications for stove products that meet the sector's requirements in terms of cost, efficiency, capabilities etc.

Overall, it can be argued that product-orientated approaches remain the most common in the humanitarian sector. This has several drawbacks when the goal is meeting energy needs. For understanding how services, not products, better meet users' needs, the experience of Digicel in Haiti (see Annex B) is revealing. Mobile phone charging stations were installed in camps and could have

been used for free by residents, but they were not. Experience showed that people preferred to pay an operator to charge their phones (service) rather than to use the solar charging station (product) with no assistance.

> In the beginning we deployed three mobile phone charging stations with no operator but realized that people were not using [them]. Clients wanted a service with someone to leave their phone during the period needed for charging.
>
> **Digicel Haiti**

Another example is the case study of Santo 17 (see Annex A). The installation of a biodigester was delivered in the same way as a product would be; and toilets, kitchens and biodigesters were built and left to the community to look after. But biogas production is the result of the proper functioning of a complex system that requires clear arrangements for ownership and responsibility in order to ensure operational management and maintenance. A poor design with no practical mechanism for cleaning the toilets, too many families for each latrine and no rules in place to regulate access to the kitchen facilities led to an absence of responsibility. This resulted in unsanitary toilets and made it very difficult to collect contributions for repairs, to maintain and empty the pit and to clean the kitchens.

In this example, the lack of a model with clear duties and benefits linked to the task of caring for the plant and maintaining the biodigesters resulted in an overflow of sludge, and not enough gas was produced. Similarly, no ownership of the mini-grid led to the overuse of batteries, the need for the implementing organizations to pay 'insurance' fees against theft and ultimately vandalism.

Case study 2: Digicel solar and Re-Volt, Port-au-Prince, Haiti

In the aftermath of the 2010 earthquake, the Haitian telephone company Digicel installed solar street lighting stations equipped with mobile phone chargers. The intention was to increase market penetration for phone use, thus far limited by lack of charge. The service was offered through micro-entrepreneurs and opened great opportunities for the operating relief organizations to communicate with beneficiaries. Digicel plans to deploy a solar home system that will eventually enable the introduction of Digicel appliances and digital services in off-grid households.

Source: See Annex B.

Reporting focused on products, which is fairly common, also constitutes a problem in that the success of the intervention is often measured by the immediate output (how many items have been distributed) rather than by longer-term outcomes (how the items entered the lives of beneficiaries and their surrounding environment, whether the goods were used or resold or broken, how the local market for similar items was affected and so forth). In many cases, budgetary allocation for follow-up monitoring and evaluation activities, starting with the initiatives' survival rate at the end of operations, could provide precious information to build upon.

Focusing on products and using the distribution paradigm indiscriminately, besides failing to meet energy needs sustainably, has several drawbacks. First, distribution has the potential to destroy local markets in areas where they exist. This was the case for private actors in Haiti, who were severely harmed by the invasion of solar lamps distributed by NGOs and other agencies.

> We had just started selling solar lamps before the earthquake. There were so many solar lamps being given away in Port-au-Prince that we just left that market alone and only sold lamps in the provinces.
>
> **Solar Haitian company**

In addition to flooding the beneficiaries' market with free products, distribution also affects the markets of host communities because products are often resold for prices considerably lower than their true monetary value. On the one hand, reselling can be seen as a failure in evaluating beneficiaries' needs and wants. On the other hand, it reveals the intrinsic difficulty of turning subjective priorities, which by nature vary from one individual to another according to the time and situation, into objective standard prescriptions that apply for the entire camp population at all times. Moreover, it is suggested that handouts are not only valued less but also treated with less care.

> Everyone who comes from unstable areas would have been in a camp five to eight times in 20 years. IDPs are used to receiving blankets for free a couple of times during the year from various NGOs operating in the camps. When in need of cash, they then resell these products for much less than their true monetary value. As a consequence, nobody in the local community will ever buy blankets that cost more than a few dollars. Same with the stoves – I know of WFP employees who would not buy ICS from producers in Goma because they know that they can buy it cheaper from an IDP or from the village association.
>
> **NGO respondent**

The fact that implementing agencies choose the items has strong implications. It affects the type of goods chosen and their purchase value. Other practices, such as the possibility for beneficiaries to receive cash aid or vouchers, could lead to wholly different choices. Arguably, the freedom for camp residents to select where to invest their money, especially in those cases in which the distributed objects are imported from a completely different economy from that of the hosting country, could bring precious insights. It could reveal what is really important to receivers and at what price they would expect to be able to purchase it.

> I do believe that people should be able to buy what they want to buy. In the north of Congo, we worked with vouchers, and stoves could be one of the items included. One problem is that stoves are often not first priority. Fishing hooks would be chosen over the stove.
>
> **NGO respondent**

The Save80 stove promoted by the UNHCR's Light Years Ahead Initiative costs $72, which exceeds the monthly average salary of people in Chad (Chad's GNI is $740). Clearly such items are extraneous to the local economy and could not be introduced sustainably by means of a local value chain, where, for example, residents receive cash to purchase a product and/or local enterprises are manufacturing it.

Another indirect consequence is that distributions create tensions with host communities. Camp residents are the target of regular donations from many organizations but the host communities, often equally poor, are excluded from any assistance.

> The government opposed investment in basic services in camps both to limit the already staggering disparities between communities and to avoid turning camps into permanent housing. The problem in situations of dense urban context such as Port-au-Prince is that you cannot single out just the camp IDPs and ignore the 'non-affected' community. The situation in these so-called non-affected neighbourhoods is oftentimes the same if not worse than that of camps in terms of lack of basic services.
>
> **Consultant to the Government of Haiti**

Finally, it is very difficult to introduce economically sustainable models in environments where a receiving mindset has been the rule for years. The distribution approach of course affects all aspects of relief assistance, not only energy. For example, a Haitian social entrepreneur who wanted to sustainably sell $5 glasses in the countryside found it impossible to penetrate a market where people preferred to wait and hope for the next NGO-led handout initiative.

> We had some issues with ICS distributions in camps. Some of our retailers were not able to sell anything just because another NGO gave a few stoves away for free. Potential clients did not want to buy anymore and were waiting for new handouts. Fortunately, after a few weeks without any free delivery, the situation reverted to normality.
>
> **NGO respondent**

However, the responsibility for the widespread distribution approach does not lie uniquely with relief agencies. It also stems largely from government restrictions, particularly in refugee settings, sometimes making distribution-based interventions difficult to avoid.

As qualitative evidence suggests, people are willing to pay when they value the good or service and it is clear that that they will not receive it for free. An internal study on solar street lighting in Haiti found that the majority of respondents (68.08 per cent) were willing to pay for solar street lighting; and 52.4 per cent of respondents in all surveyed areas claimed to be willing to pay an average of 10 to 250 HTG on a monthly basis for maintenance. Only 5.6 per cent of respondents expressed a more generous willingness to contribute with a range of 400 to 1,000 HTG per month, against 33.3 per cent who did not want to make any payment.

Cash aid or voucher-based approaches seem to show positive preliminary results, according to the literature (Harvey, 2005 and Harvey, 2007). 'One promising avenue to help refugees overcome barriers to entrepreneurship is through the introduction of cash-based aid programs. As recently piloted in Gore camp in Southern Chad, the transfer of cash aid to refugees is a source of capital for RCEs (Refugee Camp Entrepreneurs) and also confers some degree of agency, independence and autonomy over how cash is spent' (De la Chaux and Haugh, 2014). Many of the respondents in a recent DFID 'Review of Non-food Items that Meet the Needs of Women and Girls' increasingly recognize the benefits of a cash-based approach. From WFP's growing use of the cash voucher and UNHCR's pre-charged credit, agencies are looking to cash and/or vouchers as a way of better contextualizing items and getting better value for money.

As a news story on the UNHCR website reports, the market in Mole refugee camp in the Democratic Republic of the Congo is now

> buzzing with stalls selling everything from fish, goat meat, cassava and vegetables to clothes, cosmetics, household items and electronic equipment. Just two months earlier, the place had been half empty. That all changed when the World Food Programme (WFP) decided to end food distributions and introduced

> cash grants for the 13,000 refugees from Central African Republic […] And these grants have helped to create new economies as well as making people self-sufficient. For example, many refugees have been busy cultivating extra crops around the camp for sale in the market, while others have become traders, bringing in goods from other parts of Equateur province to sell to their cashed-up compatriots (UNHCR, 2014c).

Capacity and expertise

As the implementation of energy delivery models is more complex than distributing products, capacity, knowledge and expertise are required in completely different ways. These ways include at the design level appreciating where unsustainable models and inappropriate solutions should be avoided; at the leadership level knowing where correct guidance should be provided; and at the operational level realizing where crucial details must not be overlooked.

In the absence of an energy reference point, lack of capacity becomes a barrier, because energy matters are addressed by practitioners from a vast range of backgrounds who are not always equipped with the appropriate knowledge and expertise.

> The Logistic cluster (WFP) took over energy for a while, because they had a couple of experts, but it then went back to the WASH cluster (IOM) [because] having a team of engineers among its partners was seen as competent enough to address energy needs.
>
> **NGO respondent**

To understand the problems emerging from a poor understanding of energy issues, it is useful to return to the Santo 17 case study, where the lack of a robustly designed delivery model was a principal cause of the project's failure. Technical expertise was also missing, leading to many difficulties: PVC pipes cracking soon after installation and a stove model with a unique knob from the gas pipe to the stove that did not allow fire regulation, that lit all the stove's three burners at once and that was accessible by children.

Lack of knowledge, in turn, led to a poor needs assessment, which failed to recognize the characteristics of the socio-cultural context. In the original plan, flush toilets were chosen, each one to be used by seven families (35+ people[4]). The community then brought this number down to three families (15+ people). Negotiating cleaning mechanisms and keeping a good standard of hygiene in the absence of piped water and cleaning products is a challenge that makes latrines unsuitable to sit on, and sit-down toilets are very hard to use without sitting.

On the cooking side, residents opposed communal kitchens for many good reasons, from privacy to security and convenience.

> 'People here do not want others to see what they eat.'
> 'You must stay there while the food cooks, otherwise it can be stolen or poisoned.'
> 'When you cook at home you can do other tasks too.'
> 'Moving a burning pot from the kitchen to home containing several kilos of cooked rice and beans is difficult.'
>
> **Santo 17 residents**

[4] The average number of people per family in Haiti is considered to be five. However, the disadvantaged sector of the population has a higher number of people per family.

Another example comes from the Santo 17 mini-grid street lights project. During the visit planned for this study, it was possible to observe that although donated public lighting no longer functioned, families who could afford it bought their own PV systems. This seems to be the case in general. An internal evaluation of the solar street lights installed in Port-au-Prince after the earthquake suggests that a significant percentage of respondents would rather have had lighting at home first.[5] More than 60 per cent expressed positive views about the project but more than 18 per cent had negative comments, notably that public lighting came before light in households.

> 'It is in the benefit of the installation company.'
> 'We should increase the ability of EDH.'
> 'Waste of money.'
> 'It is for streets and not for the interior of our houses.'
> 'We do not have electricity at home.'
>
> **Respondents from street light evaluation study**

The energy needs of camps generally fall under the responsibility of logisticians. A lack of knowledge and experience with proven renewable energy systems, and a lack of out-of-the-box solutions comparable to generators, can limit the appetite for innovation. New solutions might give the perception of being exotic and cumbersome while the issues associated with known solutions are underestimated.

> The reality in the field dictates the solutions provided; solar is costly and driven by availability. If storage is required, the price goes up. Security then becomes an issue, as poverty results in a lot of theft. If the technology is sensitive and requires skilled technicians, you may not be able to service them; yet poor road and logistical conditions almost guarantee that upon arrival, all new equipment is damaged. Then there is the issue of expensive spares that are in any case not locally available.
>
> **MINUSTAH respondent**

Difficulties are certainly present but they may not be as pervasive as they seem at first. On the one hand, alternative solutions, and particularly solar, are becoming increasingly competitive in price; on the other hand, generators are also reported to break down frequently and they normally require parts to be shipped and trained technicians for maintenance.

Knowledge at the end-user level also needs taking into account. In the literature, there are examples of solar lamps being distributed without sufficient training for the users to know that the PV panel must be in the sun, or explanations as to why batteries are required in order for electricity to be available after dark. In consequence, the users keep the lantern inside, believe it does not work and do not use it.

The knowledge and skill of personnel dealing with energy solutions is essential, and yet the lack of dedicated resources for energy means that energy practitioners are not sought after. On the job-search website ReliefWeb,[6] current priorities are reflected in the way content is structured. Themes are organized roughly around the clusters and cross-cutting subjects such as gender. Energy posts

[5] Project Light and Security, implemented in vulnerable neighbourhoods of Port-au-Prince between 2010 and 2012 by MINUSTAH (the United Nations Stabilization Mission in Haiti), the CVR (Community Violence Reduction) Section, the Brazilian Battalion and other organizations in collaboration with Haitian authorities and two local companies.
[6] See the ReliefWeb website at www.reliefweb.int.

are typically found under 'Climate change and environment' or by performing specific word searches. Taking WASH for comparison (a role that requires similar competences), a search of the three keywords 'WASH', 'water' and 'sanitation' gives 514 entries, 25 times more than a search of the four keywords 'stoves', 'solar', 'biogas' and 'renewable energy', which results in 20 hits. Interestingly, of these energy hits, four are not relevant, two are calls for proposals, one is for procurement of solar systems and another eight are opportunities for logisticians responsible, among other things, for the management of power supplies equipment, including solar panels. In sum, there are only four 'access to energy' posts but nine roles related to procurement.

Although this has no statistical relevance, it seems to suggest, given the few vacancies, that energy issues are still a niche interest and that much still needs doing. Based on the requests for procurement, it also suggests that organizations have only just begun to seek alternative solutions to fossil fuels in camp operations. Although demand for specialized personnel has not yet noticeably grown, it is expected to do so as agencies' interest in energy increases.

> For most agencies, energy is not a top priority; they do not have a dedicated person. Even the largest organizations have difficulties to find someone who knows how to run a project and also has technical knowledge. That's the gap in the industry.
>
> **NGO respondent**

Recognizing the gap between the need for, and the availability of, energy competences, the SAFE initiative organizes training workshops for UN personnel and other field staff on the implementation of SAFE projects, and it is looking at developing a standard SAFE expert curriculum. A further aim, starting with the compilation of a roster of experts, is to establish means for the deployment of SAFE professionals to assist in crises. Such a list could also constitute a precious resource for relief workers to complement their energy training with support in a technical field such as energy.

Coordination among organizations and with the surrounding environment

The missing reference point for energy concerns has implications for the way in which agencies coordinate on the ground among themselves and with local authorities, often resulting in less effective interventions. The WASH, health or shelter issues benefit from existing working mechanisms whereby cluster leaders from relief organizations are appointed as overall coordinators for that issue (e.g. in 2010 Haiti: Unicef for WASH and education, UNHCR for protection, MINUSTAH for security, the IOM for CCCM and shelter). But energy is not represented, and ends up being included in scattered projects developed separately by individual actors. This, in turn, seems to lead to competition for resources from donors rather than providing a clearer way to channel funds. The interaction with local and national authorities also suffers from the lack of a recognized interlocutor whose mandate would include maintaining relationships with third parties, advocating for energy services and seizing opportunities to organize coordinated projects. A single vision and a clear leadership in addressing energy needs, shared and followed by all relevant organizations, would channel efforts in a more efficient way by responding to common needs assessments, market analysis and joint planning.

To illustrate the point, several respondents in Haiti after the earthquake reported duplication of efforts, for example in the distribution of solar lamps: different organizations were fundraising for and implementing their own projects in the absence of common guiding strategies.

> I know that d.light design sold more than 40,000 lamps to the World Bank, who gave them to EDH [Haitian electricity provider], who gave them out in Port-au-Prince. Tough Stuff sold several thousand lamps to some NGOs. I think Sun Transfer also sold some, probably to some German NGOs. Later on, in 2011, we won an international tender from IOM, who purchased 8,000 Barefoot Power lamps with phone charging which were given out in several of the camps. Last year we also won a tender from IRC for 1,000 d.light products.
>
> **Solar Haitian company**

Similarly, in the case of stoves, many models, mainly imported, were distributed by all types of actor, from NGOs to missionaries and UN agencies. Both the lack of coordination among different organizations and the rotation of personnel within them contributed to the creation of an unharmonious environment. Respondents reported that in numerous cases, people were coming and going, implementing ad hoc interventions, distributing free items and leaving after a few weeks. In those situations, the absence of follow-up maintenance and poor need assessment resulted in residents soon reverting to traditional stoves.

Once more, Santo 17 presents useful insights. Even though it was designated as an example for the implementation of sustainable solutions, each organization picked and chose what to do without necessarily coordinating its work and goals with those of others. Stoves were distributed in progressive stages and different types of toilet were built by several organizations. In addition, the Haitian government built a propane-burning communal kitchen. Better cooperation between camp management and local authorities could have brought the kitchen and the biogas system together, delivering a more sustainable solution. Better cooperation with local authorities could have ensured usage and continuity, while international organizations could have provided the infrastructure to reduce fuel costs.

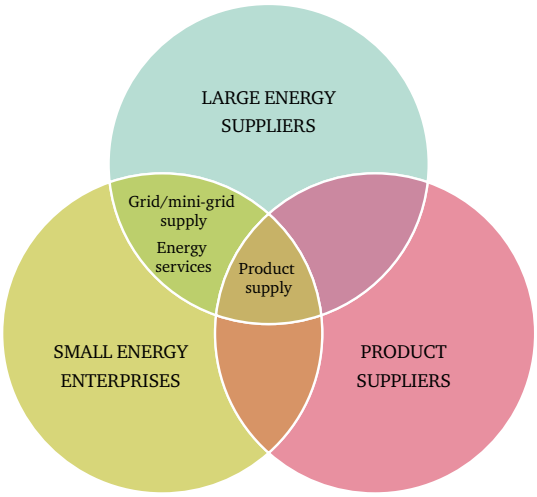
Engagement with the private sector and market dynamics

Private-sector involvement with the humanitarian world occurs at several levels and with several modes of engagement and motives for involvement, including philanthropy, corporate social responsibility and core business interests. International companies are the most common provider of products for both beneficiaries and humanitarian operators. Sometimes they also provide services, as in the case of telecommunications companies.

There are potential roles for larger energy suppliers in providing packaged energy solutions (diesel gensets and hybrid systems) to the humanitarian agencies to power their compounds and buildings. This could be by way of a product contract, a build contract or a BOO (build, own, operate) contract, which includes ongoing maintenance, or a contract in which the service is paid for by energy unit. This demand could act as an anchor load, with the possibility of extending the grid to the displaced population if the market opportunity exists. In fact, as shown in the energy value chain, the private sector could undertake any of the roles, which include 'non-energy' services such as the provision of consumer finance.

Finally, and of much importance, are the small businesses set up by residents or the host community both within and outside the camps. These enterprises have significant economic potential. For example, Dadaab in Kenya, one of the world's largest refugee camps, generates approximately $14 million per annum for the host communities around the camp and $25 million per annum from refugee enterprises (Okoth, 2012). Figure 6 demonstrates that the energy private sector is not homogenous and that different types of energy organizations will see different opportunities in the provision of energy services and products.

Figure 6: Private-sector organization

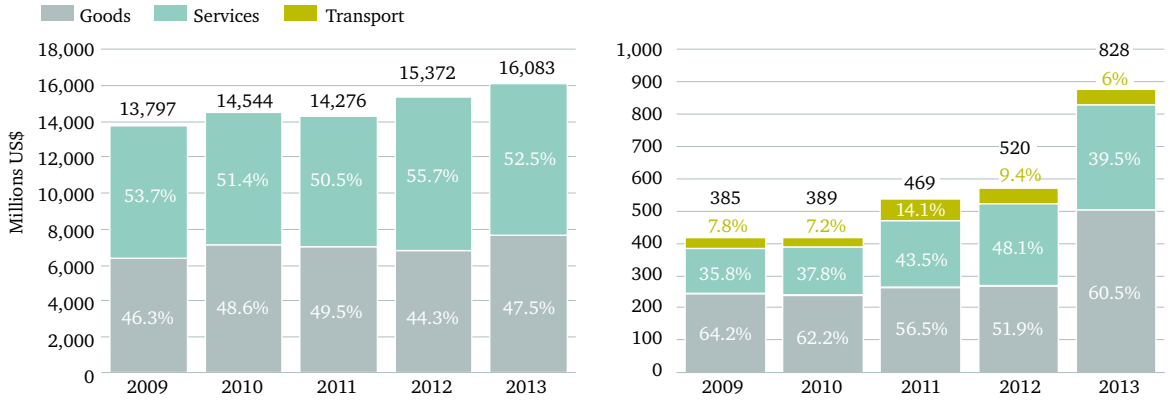


For product providers, emergencies can constitute a good market opportunity – either when goods are bought by donors to be distributed to beneficiaries or for serving the needs of camp operators. Figures for the years 2009 to 2013 are shown in Figure 7 right. According to the Annual Statistical Report on United Nations Procurement (UNGM, 2013), the UN system's procurement of services has exceeded its procurement of goods since 2008, as seen in Figure 7 left. Services are defined as

> work, duty or labour performed by a contractor pursuant to a contract. Rendering of services may involve the associated provision of utilities or facilities if specified in the terms of the contract. Typical examples of services include security, catering, cleaning, travel management, event management, IT services, training, freight forwarding, and consulting.

Interestingly, the procurement of goods includes not only 'objects of every kind and description including raw materials, products and equipment and objects in solid, liquid or gaseous form' but also 'electricity, as well as services incidental to the supply of the goods if the value of those incidental services does not exceed that of the goods themselves'. Although not confirmed by UN sources, this suggests that much energy budgeting could be recorded as goods rather than services. This includes fuels, equipment such as generators and also generator maintenance and electricity.

Figure 7: Left: Total UN procurement of goods and services, 2009–13 (% and $ million) Right: UNHCR procurement, 2009–13 ($ million)



Sources: Left: UNGM (2013); right: UNHCR (2014e).

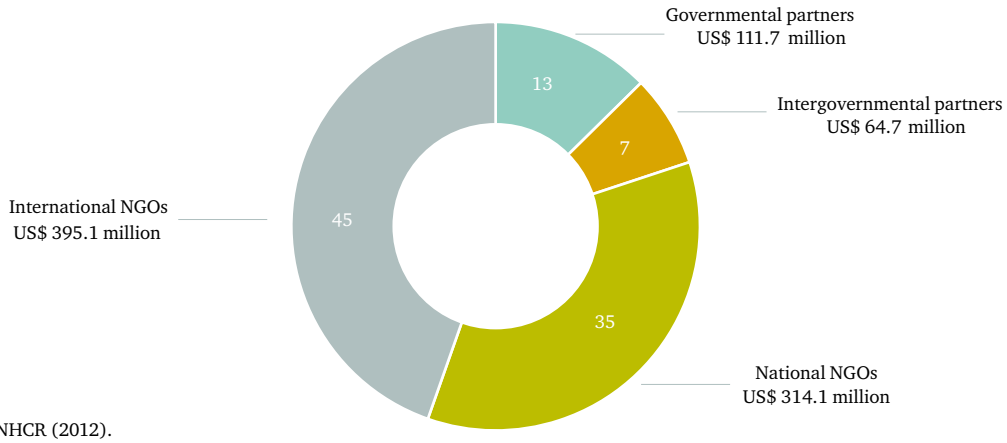
The UNHCR operates a centrally controlled emergency stockpile of the main relief items: four-wheel-drive vehicles, computer and telecommunications equipment and office start-up kits with the capacity to meet the initial requirements of an emergency operation for 600,000 beneficiaries (UNHCR, 2014g). In addition, regional stockpiles, selected strategically to be located closer to politically unstable countries, have as their main items blankets, plastic sheeting, kitchen sets, jerry cans and rolls of plastic. In principle, ICSs and solar lamps could be included in the regional stockpiles – the UNHCR is now considering them as a core non-food item – while power generation systems other than generators could be standardized and stocked centrally. The challenge lies in competing with the existing standardized solution that is known, proven and embedded in all procurement mechanisms. In fact, generators, together with jerry cans, tents and blankets, figure in the list of articles to be purchased under Frame Agreements (UNHCR, 2007b). Interestingly, solar panels are on the list of frequently purchased items,[7] under the heading 'Telecom equipment', together with radios and satellite parabolas. Generators have their own heading. Further research is needed in order to understand what would be the clearest and easiest way to include sustainable energy in budgets and procurement mechanisms.

Besides procuring goods and services, UN agencies can acquire them through partnerships. The UNHCR website explains that

> in its efforts to protect refugees and to promote durable solutions to their problems, UNHCR works in partnership with many actors. These include other United Nations agencies, NGOs, governmental as well as inter-governmental organizations, and various civil society partners such as universities, advocacy groups, foundations and corporations. Between them, they provide an array of services for displaced people including food, water, shelter, legal assistance, education and health care.[8]

UNHCR partners with NGOs by providing the financial support to perform specific services to help beneficiaries. This arrangement is reflected in a formal project agreement subject to specific UNHCR financial rules and regulations. Between 1994 and 2003, the UNHCR channelled $4.3 billion through its implementing partners; two-thirds of this amount went to NGOs. In 2012, UNHCR funded and worked in partnership with 757 NGOs across the globe. Around one-third of UNHCR's total expenditure on protection and assistance is channelled through cooperation with NGOs and other partners, including national organizations working in remote areas. Figure 8 shows UNHCR's expenditure on projects implemented through partners in 2012.

Figure 8: UNHCR expenditure in cooperation with partners, 2012 ($ and %)



Source: UNHCR (2012).

[7] See the UNHCR website for further information at http://www.unhcr.org/479d9b192.html.
[8] UNHCR website at http://www.unhcr-northerneurope.org/about-us/partners.html.

Partnering with corporations is also possible but it entails a completely different relationship. In this case UNHCR receives support from the business actor in exchange for visibility, for a reputation for good corporate citizenship among investors, customers and employees and for more stable markets and political conditions conducive to business.[9]

It is therefore clear that engagement with the private sector and with not-for-profit organizations follows two different pathways and that working across these channels may be difficult. This could be a shortcoming in some situations because although the implementation of energy-delivery models can occur equally through companies, social enterprises, cooperatives and specialized NGOs, the complexity of energy systems can require levels of capacity and expertise most often found with private-sector actors. For services typically provided by NGOs but whose complexity of energy solutions demands a business approach, a mixed model would seem most suitable, but it is perhaps more difficult to organize through the existing inflexible mechanisms for engaging with service-providers.

As an example, latrines in all camps in Haiti were emptied by the local private company Jedco.[10] Working with the company to treat waste in semi-industrial and centralized ways would have presented far fewer challenges than dealing with the full sanitation–cooking cycle at the beneficiaries' level in the Santo 17 project. While traces of Santo 17's sad experiment remain forgotten and unquoted, Jedco is looking for funds to build a biodigesting system that will produce electricity from methane. Innovative models with mutual benefit could have been put in place that would have provided Haiti with better waste treatment, the company with additional profit and humanitarian organizations with a reduction in service tariffs.

> Jedco Services is currently working with another environmental partner to set up a controlled disposal site where we will not only decontaminate liquid waste but transform it into methane, then energy. We remain open to different sources of funding and suggestions from potential international partners in order to finalize this project which will greatly benefit the ecosystem. As for now, we are disposing of the liquid waste in an authorized governmental disposal site.
>
> **Jedco website**

The case of Jedco is of an external company providing a service for the camps. In other instances, similar companies could emerge from within the camps and provide employment and opportunities for beneficiaries. To ensure technical reliability, implementing partners would most probably need to work side by side with private actors; and to enable such interactions they would probably require innovative models.

Perhaps the main role, besides product supply, that the private sector currently plays in camps is in fuel supply. This is mainly as a firewood collector and charcoal-maker that sells its products to the refugees/IDPs in the camps and also to the host communities. The make-up of these private operators is split between camp residents and host communities. It varies between sites and depends on the legality of camp residents in accessing firewood and its scarcity. Fuel-supply activities depend on the ability of buyers to afford the fuel, who in turn depend on income-generation activities in camps (or on negative coping strategies such as the sale of food rations).

[9] See the UNHCR website at http://www.unhcr.org/pages/4a13d0296.html.
[10] See the company website at http://www.jedcoservices.com/green.html.

The number of small and medium-sized services needed daily in camps is enormous. Milling grain, water treatment, water pumping, waste management, washing clothes, recycling (plastic, metal, paper, glass and possibly reusing some of these materials or preparing them to be sold), preparing pre-cooked food, drying or baking food and refrigerating are some services, among many more. Access to capital or grants would be required to cover the purchase of the initial equipment, but the service could then flourish. As a concrete example, chlorine-making technologies[11] are simple to operate and provide a way to reduce the import costs of products to disinfect water or clean toilets, kitchens and hospitals.

Case study 3: Chlorine-making equipment: DeNora S.P.A.

SolarMac®7NGO machines allow the local production of sodium hypochlorite, the most commonly used disinfectant in the world, used to eliminate water-borne diseases such as cholera, typhoid and dysentery. Potential users are communities that lack access to potable water and a power supply. SolarMac7NGO uses a simple, solar-based process of electrolysis to convert salt and water into sodium hypochlorite. The resulting solution can be used for chlorination of water to drink or as a disinfectant for use in households, hospitals or community clinics. While a similar model has been used in 2010 Haiti, installations for SolarMac7NGO have so far been made in Uganda, Nepal and India.

Source: Industrie De Nora S.p.A.S..

Market dynamics can enter camps and create livelihoods for beneficiaries by other means, such as cash for work, which is a relatively common practice. In this context, beneficiaries can constitute a pool of local talent and a working force able to provide services to both the external world and the camp community itself, as suggested by the following examples. The first two describe experiences of peacekeeping forces with ex-combatants; the third refers to an IT company set up in Dadaab.

Case study 4: Working opportunities for beneficiaries

In Sudan, a partnership with a private recycling company has been developed by UNDP and UNEP to support employment opportunities for ex-combatants to work in waste management and recycling.

The MINUSTAH-led Community Violence Reduction Programme has implemented over 100 projects to support debris-removal efforts and infrastructure rehabilitation, including the rehabilitation of 56 drainage canals and 15 water management systems in high-risk flooding areas in Port-au-Prince. These projects, which employed 44,000 at-risk individuals, built over 3,000 dry-stone dams over a length of 45 kilometres of ravines and rehabilitated 26 kilometres of canals (UNEP, 2012).

In the Dadaab refugee camp, the social enterprise Samasource has outsourced small digital tasks to refugees with basic computer skills (Betts et al., 2013). As a result, refugees have been able to save capital to start a business, develop social networks, meet like-minded individuals and improve computer skills. Supporting employment-creation opportunities may also help to reduce camp conflict and unrest (De la Chaux and Haugh, 2014).

[11] See, for example, the Electro Chlorinators produced by De Nora India, a branch of Industrie De Nora S.p.A., at http://www.denoraindia.com/Products/ElectroChlorinators/Default.aspx.

According to HIP, 'engagement in entrepreneurial activity by refugees in camps helps improve both the socioeconomic prospects of refugees and the climate of the camp. Refugee camp entrepreneurs (RCEs) reduce aid dependency and in so doing help to give life meaning for, and confer dignity on, the entrepreneurs' (De la Chaux and Haugh, 2014).

This holds for projects of all scales, from the bigger ventures mentioned above to individually run micro-businesses. Examples of businesses are plentiful, both supported by humanitarian actors and not. In most camps, some entrepreneurs use small gensets or PV modules to provide electricity to a number of customers and/or to charge for mobile phone charging. For example, in the Dollo Ado camps in Ethiopia, entrepreneurs have invested in 30 kVA to 100 kVA generators and sell electricity to the marketplace and to host communities based on the number of items they install (McCallion, 2014). Camp residents are charged the same rates as the host communities in order to ensure that there are no tensions between them. Other entrepreneurs may buy their own genset to power their own business, e.g. an internet café or a video hall.

In camps where there is some form of electricity infrastructure, businesses may be established where the electricity is diverted from the system and sold to households. In the Zaatri camp in Jordan, it is reported that 'some 350 refugees with technical skills have illegally diverted electricity from the public lighting system to about 70 per cent of the households, charging for hook-up and maintenance' (Daraghimeh, 2013).

Table 1 below, from the HIP paper on refugee livelihoods in Kampala, Nakivale and Kyangwali refugee settlements, presents a comprehensive list of spontaneous businesses observed in Kampala, Uganda (Omata and Kaplan, 2013).

Table 1: Main livelihood strategies in Nakivale and Kyangwali

Type	Activity
Farming	Selling agricultural crops, brokerage of crops with locals
Animal husbandry	Rearing livestock
Petty trade	Selling general merchandise (e.g. soap, matchboxes, cooking oil)
Wholesale business	Selling food items, beverages and general merchandise
Food-related business	Restaurant, bar, butchery, brewery, selling beverages
Entertainment	Running cinemas, selling digital music
Technical service	Electrician, mechanic, carpentry, craft-making
Beauty care	Hair salon
Clothing	Tailoring, selling clothing, textiles, second-hand cloth and shoes
Finance	Money transfer, Forex bureau, micro-finance
Transportation	Boda-boda (motorbike taxi), taxi, minibus
Medical work	Running a pharmacy, nursing
Accommodation	Running a guest house/lodge
Manual work	Construction, farming for others, housekeeping chores for others
Institutional employment	Working for UNHCR Implementing Partners and Operational Partners
Electricity	Power supply using generators
Negative coping strategy	Commercial sex, begging

Activities supported by NGOs that promote local entrepreneurship as an alternative model to distribution are also available on the ground. For example, in some cases training has been provided to local women in making mud or clay energy-efficient stoves that they can then sell. But the potential gains to these women entrepreneurs are limited because other agencies may be distributing stoves, as happened in Darfur. Some interventions in Darfur have tried to trigger more market exchanges by helping the users to take on a consumer role (Abdelnour, 2014).

Another experience, focusing on distribution rather than production, is that of the French NGO Entrepreneurs du Monde (EDM). It has been engaging with beneficiaries in business-like ways in Camp Corail, a Red Cross camp in Haiti. EDM has sold more than 2,500 ICS so far with a direct credit system. Each EDM salesperson receives a free stock of 100 units and is paid on commission. S/he manages about 10 retailers living in the camp who are provided with a free stock of five units, sold to customers on credit. The repayment period is set at four months. Retailers are supported with demonstrations and raffles.

In the Santo 17 case, the central cooking model proposed was not a popular choice for many reasons, but since one meal per day on average is purchased from street-food vendors, a biogas system providing fuel to street-food vendors would have had a better chance to succeed than a household-based one. This would have required working with fewer individuals, which would have been motivated by the prospect of increasing their revenue and of the fuel being delivered directly to the cooking location. Adding a component to an existing structure is easier than having to build everything from scratch, and street-food vendors already operate in the Haitian context. Of course, this approach requires an understanding of what assets a community has and the specific needs of the environment (asset-based community development).

This is in line with one of the recommendations from the HIP paper on Refugee Economies (De la Chaux and Haugh, 2014):

> 'Build upon what there is' is one of the fundamental principles for development practitioners. Interventions that aim to promote refugees' sustainable livelihoods must be based on a sound and comprehensive understanding of existing markets and the private business sectors within which refugees are making a living. Premised upon an appreciation of existing refugee economies as complex systems, interventions should aim to either improve existing markets or to empower refugees to more effectively engage with those markets.

Although its experience does not relate specifically to camps, it is interesting to refer to the work in the forestry sector of another not-for-profit organization, the Yunus Foundation, which is addressing reforestation in business-orientated ways.

Case study 5: Reforestation by Yunus Social Business, Haiti

As previous initiatives show that reforestation cannot be based on free hand-outs of trees or programmes relying on traditional charitable funding which are inevitably limited in time, the Haiti Forest project, supported by Yunus Social Business, Virgin Unite and the Clinton Foundation, is designed as a market-based ecosystem of social businesses along the agro-forestry value chain. The project aims to create market value around trees, and make tree planting an intrinsic part of the agricultural system. The initiative acts along three lines: increasing forest cover, reducing farmers' dependency on charcoal production and reducing demand for charcoal. Eight social businesses have been identified to be supported under this programme, from the commercialization of agro-forest products (supported by financing better storage and marketing solutions) to processing of fruits and construction trees, to distillery of sugar cane-derived alcoholic beverages (supported by shifting from powering the process with bagasse instead of firewood).

Ad hoc services versus multi-sectoral systems

It has been argued above that energy needs are best met by energy services rather than products. It can also be seen that the exploitation of several renewable energy resources involves multi-sectoral aspects and affects several needs. Energy issues are thus most helpfully addressed as part of a suite of interdependent services rather than by isolated solutions for specific needs. In addition, this would help to address financial gaps by drawing resources from non-energy programming budgets.

Such is the case for biogas systems, which can meet needs in sanitation, waste management, cooking, organic farming and food security. The sectors involved range from sanitation (the energy source is generated) to waste management (the energy source is collected) to energy (the fuel is produced) to agriculture (slurry is used a fertilizer) and back to food (agricultural products are eaten). Biomass and biofuel power-generation systems present similar patterns. In these cases, implementation can hardly be the task of any of the existing humanitarian clusters, as they are isolated in their own silos. In fact, the natural resources revolution of the current century (increasing scarcity of fossil fuels, land, water, nitrogen etc.) demands an approach that looks simultaneously at whole systems, their energy resources, productive activities, efficiency and the attitudes of the people forming them.

> If the donors and camp management would allow it, you could harmonize activities, use a more holistic approach with the participation of IDPs. WASH programmes could make proper latrines, waste pits to recycle and make something sensible with plastic, compost can be used for food security programmes, but it all has to be organized and come together.
>
> **NGO respondent**

Integrated systems offer great opportunities for saving money and emissions, creating productive activities and, even more important, making lives meaningful.

> I was doing permaculture with refugees, got them to design their own gardens and the most inspiring part was to see the pride people felt when the first results started to emerge, when the carrots grew. It touched people, the psychosocial impact was incredible. They would go and walk in the gardens. In Dungu a woman told me it was the Garden of Eden.
>
> **NGO respondent**

The Integration of Energy in Humanitarian Responses

Summary points

- The absence of an institutionalized presence for energy in humanitarian responses affects the ability of energy initiatives to play a larger, more appropriate role in several ways: funding is not automatically budgeted in relief operations; also, no particular agency has a mandate to call for energy interventions or to take the responsibility to ensure their success.
- Gaps in accountability start from reporting formats that focus on other priorities. The lack of indicators on costs, emissions and other aspects of energy use mean that it is difficult to capture the sustainability of implementation models. Reporting formats can be shaped to include meaningful information that measures the impacts of sustainable energy adoption.
- The SAFE initiative is working to ensure an energy reference point and a finance mechanism in humanitarian responses.
- Differences in contracting mechanisms between the private sector and not-for-profit agencies, and historical preferential relationships with the latter, seem to encourage agencies to work mainly with NGOs, which at times is detrimental to energy projects. Novel mixed approaches and more flexible rules that enable the support of market-orientated activities could be beneficial.
- Typically short-term humanitarian funding mechanisms and the net separation between humanitarian and development budget lines restrict opportunities for sustainable energy. However, it would seem possible to address these challenges using existing innovative approaches.
- The greater use of innovations such as cash grants could open the way to a flourishing ecosystem of energy micro- and small enterprises in camps.

The challenges analysed in the previous chapter could in principle arise from specific situations and contexts. The interesting question is whether or not Santo 17 is an isolated case and whether the failures of its energy solutions are due to an unfortunate series of mistakes and adverse factors or reflect a more diffused reality on the ground. Might Santo 17 be in part the result of systemic mechanisms, policies and practices that are limiting the expansion and success of energy interventions?

The absence of an institutionalized presence for energy in humanitarian responses affects the ability of energy initiatives to scale up in several ways: funding for it is not automatically budgeted in relief operations and no particular agency has a mandate to call for energy interventions or the responsibility to ensure their success. Differences in contracting mechanisms between the private sector and not-for-profit agencies, and historical preferential relationships with the latter, seem to encourage agencies to work mainly with NGOs, which at times is detrimental to energy projects. Novel mixed approaches and more flexible rules that enable the support of market-orientated activities could be beneficial. It would clearly seem that some aspects of the way in which energy is currently integrated into emergency responses might be hindering the scaling up of energy solutions.

Energy needs institutional recognition

At the base of many of the shortcomings identified in the previous section – from the lack of coordination on the ground to inadequate levels of capacity and expertise – is the absence of a clear reference point responsible for energy matters. Without an institutionalized space for energy, no one is strongly motivated to advocate for funds and initiatives and no one is truly responsible for the performance of the sector as a whole.

For decades, energy has not been considered a focal point of international cooperation. Energy did not appear in the Millennium Development Goals; and it is only in recent years, with the launch of SE4All and its pillar on access to energy, that a change has started to take place, although primarily in the development sector. This trend is gradually spilling over into the relief sector, but efforts are still needed to strengthen the focus on the needs of humanitarian populations for access to energy.

During the initial phase of relief missions, fundamental needs other than energy are automatically factored into budget lines with appropriately sized and dedicated funds (as is the case for the clusters WASH, shelters, food and health, or cross-cutting issues such as gender). But energy remains relegated as a chapter within bigger projects. It figures mainly as a way to address other needs such as protection and the environment and to ease tension with surrounding communities.

> As street lights were placed in front of schools, community tents but also and particularly toilets, water points and other WASH facilities, they did end up as part of WASH and actually monitored by a WASH indicator.
>
> **NGO respondents**

A rapid SAFE assessment (WFP and WRC, 2010) by the WRC and WFP after the Haitian earthquake in 2010 reported that energy needs on the ground were not promptly addressed, for reasons including lack of knowledge regarding available options, lack of experience/expertise in addressing fuel-related concerns and lack of advocacy within the system. None of the agencies involved in the immediate response had energy as a primary concern; and this meant that during coordination meetings and at the operations-management level, no one had the interest, mandate or capacity to promote the inclusion of energy as one of the top priorities in the response activities.

> The food itself, the pots in which to cook the food and the utensils with which to eat the food are being distributed. However, the middle piece of the 'edibility equation' – how to turn the distributed dry rice that should be cooked in the distributed pot into something that can actually be eaten with the distributed utensils – is entirely missing
>
> **WFP and WRC (2010)**

Good progress has been made since 2010. SAFE partners, such as UNHCR, are now beginning to add ICSs and solar lamps to emergency kits, and fuel is increasingly a part of the equation. This is positive. However, the prioritization of ICSs over fuel supplies seems odd, as ICSs are useless without fuel but, in most instances, people can cook without them. Moreover, the addition of energy products is just the first step towards a more comprehensive recognition of energy needs and the inclusion of energy services side by side with other fundamental necessities.

As in other sectors, the inability to document failure, to develop lessons learned and then to use this to better inform future programming is a critical drawback and an ongoing challenge. This becomes

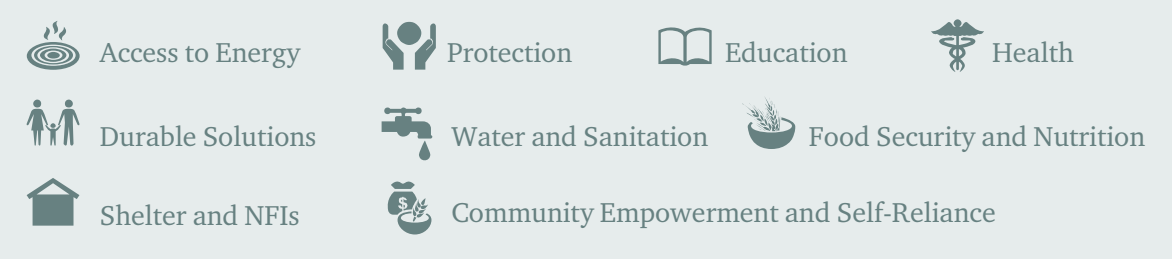
particularly important because, as has been noted, no agency is formally responsible for energy issues, making accountability a bigger concern. Where energy projects are part of larger programmes implemented by agencies that are responding primarily to other imperatives, the focus on the success or failure of energy initiatives is inevitably weak.

> Organizations either do not have resources or personnel or do not have the commitment. Even projects that fail can satisfy reporting needs, there is no monitoring and activities end with the report.
>
> **NGO respondent**

In looking at the structure of UN reporting formats on camp activities, it is evident that institutional recognition of each topic dictates the space allocated in reporting. Document sections are in fact organized according to clusters or cross-cutting issues. For example, an update on IDPs in Camp and Host Communities in Adamawa, Nigeria by OCHA, from October 2014, states that 'priority needs remain around food, health, protection, water, sanitation, and hygiene (WASH) activities'. Updates from these areas are featured in the following sections but energy is excluded. This leads the reader to think that energy is not an urgent issue in the camp at this point, but other information from the document seems to suggest otherwise.

For example, the Food Aid and Security section mentions the distribution of food items needing cooking, such as rice, maize and beans, and a communal kitchen serving wet rations three times a day, but there are no references to the cooking devices or fuels used. Other energy services, such as power for the six-bed clinic and the possibility of producing drinking water, which is currently trucked in, are also missing. The need for electricity for lighting is mentioned several times from a protection viewpoint (OCHA, 2014). By contrast, in the UNHCR's weekly updates from Dadaab refugee camp in Kenya, where 'access to energy' is highlighted among the other updates (UNHCR, 2014b), energy issues and achievements become accountable for and acquire visibility. The icons used as headings for the different topics including access to energy are shown in Figure 9.

Figure 9: Logos for 'Access to energy' section in UNHCR Dadaab reporting format



Source: UNHCR, 2014b.

In addition to visibility, monitoring and evaluation could be added to criteria in assessing the sustainability of projects. To do this, specific measuring tools would be needed, such as indicators that extend beyond the immediate output. For example, in the UNHCR FRAME Toolkit (see Table 2), the core indicator C4, for Domestic Needs: Increase in families consistently using fuel saving devices and practices, gives information about the number of stoves being used but does not report on the implementation models for how the stoves got to the family in the first place. Have the fuel-saving devices been distributed or bought? Were they produced by a sustainable value chain? Have they

created local jobs? Is there a system for their maintenance and replacement? It seems that distribution is assumed to be the delivery method implicitly adopted.

Table 2: Non-exhaustive sample of indicators extracted from the Core Indicators table for environmental programmes of the UNHCR FRAME Toolkit

Sector	Reference no.	Indicator name
Food	A1	Energy-saving cooking habits practised
Domestic needs	C4	Increase in families consistently using fuel-saving devices and practices
Crop production	J1	Sustainable agricultural activities practised
Forestry	M3	Number of seedlings produced versus target
Forestry	M5	Number of surviving seedlings at end of first growing season

Source: UNHCR and CARE International, 2009b.

In order to capture data that describe more of the delivery model and the long-term benefits, performance indicators could include costs and emissions, and evaluations could extend beyond the end of the project and clearly price energy services in their entirety.

These mechanisms would need to be addressed at the time of contract. For example, in a call for expression of interest in the implementation of an energy project intended for refugees in Djibouti (UNHCR, 2014d), the focus is on the immediate output indicators (see Table 3). This discourages applicants from finding sustainable solutions for the required energy service.

Table 3: Sample of performance indicators extracted from a UNHCR call for expression of interest

Performance indicator	Target
Output: Alternative/renewable energy promoted	
Percentage of households using alternative and/or renewable energy (e.g. solar, biogas, ethanol, environmentally friendly briquette, wind)	100
Percentage of households using firewood harvested in a supervised manner	100
Output: Electricity/lighting provided	
Percentage of households with access to electricity/lighting	40
Percentage of health facilities with access to electricity/lighting	100
Output: Energy-saving practices promoted	
Percentage of households provided with energy-saving equipment	100

Source: UNHCR, 2014d.

Fuel costs for compounds are another factor that seem very difficult to monitor, as became clear from several of the interviews with camp operators. Respondents pointed out that the current reporting system does not compel implementing organizations to save on fuel costs. To explain: in project budgets for a compound of offices, fuel appears as a running cost proportional to the number of people served. As the expense is paid per person, the true cost of fuel use during implementation may never be known. Although several respondents stated that costs are high, the exact figures are difficult to retrieve. This implies that there is no standard mechanism to feed information back to the implementing agency and the funding donor, which also makes it hard to compare the costs of different projects. It follows that when fuel costs appear in a proposal submitted for evaluation, tools and reference data for enabling donors to evaluate competitiveness are missing.

> We do not have a significant structure in place to evaluate what is moderate/average costing for fuel budgeting. We either pay the bill directly or the implementing partners will pay via their budget.
>
> **UNHCR respondent**

UNEP's report *Greening the Blue Helmets* (UNEP, 2012) mentions findings from US military operations in which fuel made up 70 per cent of all tonnage shipped to bases; and for every litre of fuel used in remote bases, more than six litres of fuel were used to transport it (Army Environmental Policy Institute, 2006). It is likely that humanitarian settings might show similar figures for certain locations.

Because in the UN annual Procurement Reports (UNGM, 2013) fields such as transport, diesel-generator equipment, maintenance and fuel would all go in separate categories, the true cost of running generators or of providing other energy services is hidden within the budgets and is much more difficult to appreciate. For example, it can seem that because fuel for transport is already shipped to remote camps, adding more fuel for generators does not have an impact. That expense is therefore not considered as related to the energy service but related instead to transport.

> Also because fuel delivery is required for transport needs, it is possible to include additional fuel to run the generators.
>
> **MINUSTAH respondent**

In looking at the top 10 goods and services categories in UN agencies, it is very difficult to understand what share in each is taken up with the provision of energy. Generators fall under equipment, but appliances to convert electricity, e.g. air conditioning and IT devices, stoves, lights and computers, come under another headline. Similarly, fuel is listed separately, and the transport and storage of fuel is yet another item. This categorization does not help in assessing the costs of current fossil fuel-based energy solutions and in comparing them with greener alternatives in which the fuel cost and its transport are the biggest competitive advantages. Equally, appreciating the impact of fuel-efficient appliances and practices in economic terms becomes a complicated task. In this case, the price of the generating equipment remains the same, the price of the appliance might be higher but the fuel-consumption and transport costs would be lower. To capture this complexity would demand new agglomerate indicators that can easily synthesize significant figures from all different data points.

While it is clear that energy does need an institutional presence, whether that could be best provided by the addition of an energy cluster within the IASC structure or as a cross-cutting issue integrated across sectors is currently under scrutiny and the ultimate decision will closely relate to UN working mechanisms. In this sense, the SAFE initiative is playing a strong advocacy role in ensuring that energy achieves a dedicated space within the emergency sector. In particular, the GACC, as a member of the SAFE Steering Committee, is now assessing the most appropriate way to include energy in the humanitarian system, either through a cluster or as a cross-cutting topic.

> The ultimate goal of the SAFE reference group is to integrate and mainstream energy in humanitarian responses, both through advocating for space in the system, potentially as a cluster (or equivalent) and [by] building a roster of experts. We are exploring the different pathways to ensure that energy is given the same attention as other sectors in the Humanitarian System, either through a cluster like WASH or as cross-cutting topic as Gender.
>
> **SAFE/GACC respondent**

Energy needs innovative approaches

Continuous improvement and modernization efforts are taking place in the UN system. This is the case for the operations management system (OMS) that provides standardized formats to work with partners (largely NGOs) for project submissions, approval, monitoring and reporting. The OMS focus has shifted in recent years towards more results-orientated planning, with a clearer definition of objectives and outputs as well as the measurement of results against set indicators. New programme management software, a financial management information system (FMIS), is being developed to support this conversion. The current FMIS was designed in the late 1980s to provide information on financial matters, but it now also needs to be able to budget and measure results in financial terms against the results framework (results-based budgeting) (UNHCR, 2009c). This updating process might be a good opportunity to include new and innovative ways of measuring energy solutions (e.g. real costs, efficiency and impact), to assess their competitiveness appropriately.

At the same time, the UN procurement framework that is used to purchase products from companies is also integrating environmental aspects, including energy. As defined by the UN High-Level Committee on Management's Procurement Network (HLCM PN), sustainable procurement (SP) integrates requirements, specifications and criteria that are compatible and that favour protection of the environment and social progress and support economic development (UNGM, 2013). The Annual Statistical Report (UNGM, 2013) states that

> UN Procurement spend, which represented $16.1 billion in 2013, can influence markets towards innovation and sustainability, thereby contributing to the UN mandate. Through its significant purchasing volume, UN organizations can deliver key policy objectives within all areas of sustainable development.

Among the expected environmental benefits of SP are helping organizations to reduce greenhouse gas emissions, improving water efficiency and supporting recycling by considering concepts such as whole-life costing. Positive social results from SP include capacity-building, poverty-reduction and improved equity. From an economic perspective, SP can generate income, optimize costs and support the transfer of skills and technology (UNGM, 2013). This seems to be the perfect opportunity for introducing appropriate energy considerations in the UN sustainable procurement guidelines that are developed to facilitate the implementation of SP in the procurement process – by providing specific criteria that may be used for the requisition and procurement of energy goods and services.

These are tremendous opportunities to advance the energy agenda within the UN system, but the reform process can be slow and difficult to trickle down. For example, prescriptions in guidelines for peacekeeping forces operators' camps include environmental concerns but reveal a lack of tangible engagement. And an extract from the UN's Environmental Policy mentions the aim of minimizing greenhouse gas emissions, but this is stated in fairly generic terms: 'The Director of Mission Support/ Chief of Mission Support will take measures to ensure that the use of energy is optimised by the mission with the aim to minimize the mission's greenhouse gas emissions while ensuring enough power for proper functioning.'

But the Engineering Support Manual clearly prescribes generators, leaving agencies with little space to decide whether to explore new options: 'when using locally installed systems adequate safeguards have to be taken to ensure reliable power supply operation for missions elements to be guaranteed. Consequently, diesel/gasoline generators should be installed and ready as backups.'

The path to including sustainable energy aspects in emergency initiatives within the UN system would have to follow two different routes because, as has been mentioned, the UN prescribes different norms and regulations for working with NGO partners and working with partners from the private sector. This could be a drawback, and might require the design of innovative models of engagement with service-providers. In fact, energy services that demand a specific competence could benefit from the more flexible interactions that are currently enjoyed by NGO partners but they would still need to ensure the high standard of skills and infrastructure that businesses can provide.

The impact of contracting procedures for companies on the timing and effectiveness of the bidding process has not been sufficiently investigated within the scope of this study but it could demonstrate a bias towards working with NGOs. According to interviewees, working with NGOs is easier. As shown in Figure 10, all purchases from the private sector by the UNHCR of goods budgeted at $20,000 or more are subject to formal competitive bidding. For procurement by UNHCR field offices, the level is $5,000. Below these amounts, supply staff are required to compare at least three offers in writing solicited under a request for quotations.

Figure 10: UNHCR procurement modalities

Request for Quotation (RFQ)	Request for Proposal (RFP)	Invitation to Bid (ITB)
Goods, services	Services and/or complex goods or works	Goods, civil works
Low value	Higher value	Higher value
Turnaround time depends on value	Turnaround time depends on value, requested offer validity usually 120 days	Turnaround time depends on value, requested offer validity usually 120 days
Direct invitations	Direct invitations, open competition (publication by advertising)	Direct invitations, open competition (publication by advertising)
• Value < $5,000 in field • Value < $20,000 in HQ • Contract awarded to the lowest price offered • No formal procedure • Deadline: any stage of the process • Minimum of 3 vendors	• Value > $5,000 in field • Value > $20,000 in HQ • Contract awarded to most responsive proposal • Weighted scores to determine most responsive proposal taking account of both technical and commercial/financial aspects • More complex requirements where ideas and input are sought from the proposer	• Value > $5,000 in field • Value > $20,000 in HQ • Contract awarded to lowest-cost eligible bid • Pass/fail technical criteria to determine eligible bids • Simpler requirements which can be assessed on a pass or fail basis and which can be clearly stated

The preference for working with NGOs is possibly also rooted in a long history of cooperation going back many years, when the UNHCR relied heavily on governmental and non-governmental organizations for support. Hundreds of national and international 'voluntary societies' already had significant refugee experience and had assisted refugees in Europe after the Second World War (UNHCR, 2004). UNHCR's website states that 'strengthened partnerships and collaboration with NGOs [remain] one of the best ways of ensuring that the basic needs of displaced populations are met.'[12]

[12] See UNHCR Regional Office for the Baltic and Nordic countries website at http://www.unhcr-northerneurope.org/about-us/partners.html.

From conversations with UN agency actors, it would appear that with time, this initial synergy has been consolidated into a culture of distrust towards profit-making actors. As a UNHabitat respondent remarks, 'We tend not to work with the private sector with the exception of circumstances where there are no obvious alternatives, as was the case for the solar street lights.' Not only do UN agencies seem reluctant to engage with the private sector in the implementation of services more directly related to beneficiaries, but there also seem to be barriers to the adoption of more businesslike ways of working. Many of the energy services required in camps could be provided by micro-, small and medium-sized enterprises supported by donors, especially in their start-up phase. But respondents pointed out that they are limited in the kind of activity they can support and are precluded from engaging in profit-making initiatives.

For example, in the aftermath of the earthquake in Haiti, the WFP was working with paper briquettes burning ICSs in schools. In order to ensure the sustainability of the programme, WFP wanted to create a market-based system in which paper briquette producers would sell briquettes to school canteens. Once initiated, this system could have been independent from donors' support. In the intermediate phases, the WFP needed to facilitate the trade while it trained briquette producers to increase the quality of their product and ensured school cooks' acceptance of the new technology. This included purchasing the briquettes (and controlling their quality), delivering them and absorbing transport costs, collecting payments from schools and monitoring the briquettes' use. Owing to restrictions in the management of funds to which the WFP is subject – it is not able to receive payments from beneficiaries – all those activities had to be outsourced to an NGO partner.

Furthermore, the rules for engaging with partners include several requirements that are difficult for the private sector to meet. A call for proposals for energy projects in Djibouti refugee camps and host communities requires 'existing or prospective partners to contribute complementary resources (human resources, knowledge, funds, in-kind contributions, supplies and/or equipment) to achieving common objectives'. This comes directly from recommendation 2.3d in the operations management handbook for UNHCR's partners:

> Contribution of resources: the support base of implementing partners, particularly NGOs, varies considerably. However, it would normally be expected that a partner, particularly an NGO, would be able to make a contribution of resources to the programme in cash or kind (e.g. staff and administrative support). In any case, NGO and UNHCR fund-raising efforts for programmes should be complementary, in recognition of the partnership principle.

A company would probably find it hard to cope with these mechanisms.

Other barriers to the uptake of sustainable energy are linked to the humanitarian sector's restrictions on funding mechanisms. UNHCR's typical budgeting timeframe is one year. Energy solutions that require initial investments larger than generators might thus be judged more expensive over the short term and dismissed. The alternative of using longer-term development funds to purchase power-generating systems would not be viable, as the intersection between humanitarian and development funding streams does not seem to accommodate overlaps such as this.

> What UCLBP pleaded for is that investment in basic services should be done first in neighbourhoods, and households should be helped in the return and reconstruction of their dwelling for it to be para-seismic. The problem is that we were advocating urban development and equity principles, which are in contrast [to] humanitarian interventions because it concerns long-term development principles. The latter could not be funded on humanitarian pledged money.
>
> **Urban planning consultant of Government of Haiti**

In addition, development initiatives requiring a longer timeframe for approval and bilateral development partners would hardly suit emergency situations.

However, while this could be a limiting factor, it would not seem to be a critical one. In fact, sustainable energy solutions are often already competitive with traditional ones even in the short term. Where they are not, coping mechanisms could be devised to address the uncertainty over the timeframe of relief operations, for example by drafting innovative financing models such as leasing or rental from service-providers. In truth, the life of energy systems does not even need to be measured in terms of the duration of the emergency operation. As the UNHCR's policy on the procurement of goods and assets states, these can be procured from suppliers through international, local and regional tenders, deployed from stockpiles or, quite importantly, redeployed from other operations (UNHCR, 2014e). Respondents in peacekeeping forces reported using these mechanisms as common practice.

> We have liquidation guidelines … It depends on the viability in some cases, as logistics has a big bearing on our operations. Generators and equipment are assessed and sent as stock for neighbouring missions, and in many cases reused unless [they are] past [their] useful life. There are procedures in place and each case is handled in a manner reflecting the specific circumstances. In some cases the equipment has been outsourced, in which case it doesn't belong to us.
>
> **MINUSTAH respondent**

Furthermore, longer-term solutions are already a concern for relief agencies, as the task of promoting durable solutions to refugee problems is embodied in UNHCR's statute. These are defined either as voluntary repatriation or assimilation into new national communities. In working towards durable solutions, UNHCR cooperates with the Cluster Working Group on Early Recovery, led by the UNDP, as well as with the World Bank and the United Nations Development Group, to promote the inclusion of displaced people in development initiatives. At the country level, the UNHCR, the World Bank and the UNDP are collaborating on the Transitional Solutions Initiative (TSI) to build self-reliance among affected populations in Sudan, while UNHCR and UNDP are engaged in a TSI pilot in Colombia (UNHCR Global Report 2012). These collaborations could lead to new ways of addressing energy needs for refugees in earlier response phases.

Examining the penetration of solutions directly affecting the lives of beneficiaries, the HIP review on Humanitarian Innovation (Bessant, Ramalingam, Rush et al., 2014) identifies some broader systemic issues characteristic of the humanitarian sector that affect the rate of innovation, such as

> the fact that the sector is a quasi-market which is shaped more by supply than by demand; the entrenched positions taken up by leading players, and the knock-on issues of dysfunctional competition and fragmentation in aid efforts; the clear limits placed on innovations such as cash that seem to carry potential to transform the sector.

Sustainable energy interventions comprise elements of innovation in terms of technology and delivery models that makes increasing their prevalence and scale susceptible to some of the same barriers encountered by other innovations. In fact, the adoption of groundbreaking solutions such as cash aid directly affects the enabling environment of energy projects. Cash aid could play a fundamental role in creating a fertile environment for the development in camps of micro- and small enterprises, including energy-focused ones. Rather than a minimal or non-existent purchasing power, cash aid could provide a customer base benefiting from steady income, something that energy businesses could bank on.

Allowing beneficiaries to express their preference about a choice of products would introduce a healthy element of competition between providers and a strong incentive to innovate, thus providing a demand- rather than a supply-led environment.

If it is true that the humanitarian sector does not explicitly contemplate the creation of market dynamics as part of its mandate, novel approaches such as cash grants and vouchers are slowly appearing on the scene, and examples of business-led PAYG solutions are also arising, with or without donors' support. It would seem that the ground is being prepared for a more substantial donor-led transformation. This would ensure both beneficiaries' ability to buy and a supply of products, such as off-grid solar solutions, through market-orientated approaches.

Conclusions

There are 16.7 million refugees in the world, and of them more than 60 per cent are refugees for five years and more, with an average length of exile of nearly 20 years. Many refugee camps reach the size of small to medium-sized cities. Despite this, camps are considered as temporary structures that serve to keep residents alive but inactive until the time of return to their home. A bold shift in this way of thinking seems required not only for energy initiatives to flourish but also to enable refugee communities to create sustainable livelihoods.

As the HIP project suggests,

> existing approaches to protracted displacement are failing. They are inefficient, unsustainable, and lead to dependency. A humanitarian response designed for the short-term too often ends up administering long-term misery. Rather than transitioning from emergency relief to long-term reintegration, displaced populations too often get trapped within the system. This benefits nobody. The existing paradigm fails to adequately recognise that refugees and other displaced persons have talents, skills, and aspirations. A rethink is urgently needed. (Betts et al., 2014)

An alternative way of dealing with camps could unleash an enormous range of opportunities. Refugee camps can and should be seen as reservoirs of resources. This would require a change of mindset about how camp residents are perceived, moving from looking at IDPs and refugees as 'beneficiaries' dependent on handouts to seeing them as 'camp citizens' able to choose, produce, consume and take part in the running of their own community.

The provision of energy services can contribute substantially to this transformation. Camps can be imagined as ordinary towns that function on the standard economic principles that regulate the exchange of goods and services. These towns need energy to maintain the life they host, to produce, purify and distribute water, to light, to heat, to cool, to manage waste and to produce food and to cook it. The greater the access to energy, the more opportunities for a meaningful life, for reintegration into society afterwards, for less dependence on donors and for a chance to live with dignity. The variety of useful activities that can be stimulated and that can have a marked impact on the lives of residents and on the expenditure of donors is limited only by the imagination. The most obvious interventions to gain attention so far, such as solar lighting and improved cooking, are part of a much longer list of opportunities.

The biggest challenges seem to reside in creating an enabling environment of strong management structures and robust coordination among actors – from a 360-degree engagement with the host community and a synergetic interaction with the local and national government to, equally important, a shared bold and inspired holistic vision. What each camp system would be able to create and support depends on many factors linked to its location (natural resources, socio-cultural environment, infrastructure and surroundings, i.e. the host community and government) and to the people inhabiting it. Ecosystems of enterprise and energy activities, as in any other human system, cannot be planned in advance and created top-down.

Redesigning the structure of camps in order to offer a friendly environment for sustainable energy solutions and innovations to be born and flourish is challenging, but possible. Perhaps the two most important elements for achieving this result are harnessing the purchasing power of beneficiaries and

creating a structured way to test innovative models of sustainable energy provision. The first element could be encouraged through the provision of cash grants and cash-for-work approaches; the latter could be promoted through 'incubation' centres in camps. By testing ideas and providing the space to experiment with new solutions and by supporting already emerging enterprises, these centres could encourage business approaches and offer a way to integrate the work of micro-enterprises (and also different organizations supporting bigger ventures) into an orchestrated plan.

> Refugees and displaced populations themselves innovate and use technology in their daily lives. Facilitating this form of 'bottom-up' innovation may offer a non-traditional way of enhancing refugees' own capacity to develop sustainable opportunities. At its most simple, this may involve improving refugees' access to ICT, as well as less conventional opportunities such as business incubation and transnational mentorship.
>
> **Bessant, Ramalingam, Rush et al., 2014**

Energy in camps has several dimensions, most of which have a private-sector component:

- Procurement of products by UNHCR and its partners for beneficiaries in the acute phase (e.g. stoves and solar lamps for emergency kits).
- Provision of products and services by external actors for the general functioning of camps (e.g. products: power-generation systems for operators' compounds, solar pumps, solar water filters, solar street lights; e.g. services: communications providers, enterprises managing water purification, waste management, electricity from biogas, composting).
- Creation of jobs for beneficiaries (e.g. WFP cash-for-work to do reforestation activities for the camp or the host community; setting up enterprises to carry out work for the external world such as simple computer tasks; setting up enterprises to carry out work for the camp otherwise purchased from outside such as waste management and purification of water).
- Efficiency measures in operators' settings (e.g. adding indicators on fuel costs, installing meters, sensitizing and motivating operators to save energy).
- Beneficiary-led micro- and small enterprises (e.g. mobile phone charging stations, food street vendors, mini-cinemas, internet cafés).

In recent years, positive trends have emerged which point to a more holistic way of integrating sustainable energy needs in humanitarian response. On the one side, sustainable-energy technology is increasingly competitive with fossil fuels. Its services can be outsourced and its equipment can be used for several missions. Taken together, these factors point to a gradual undermining of the economic argument which underpins the status quo.

On the other side, camp operators, managers and sector specialists are increasingly recognizing, and working for, the uptake of sustainable energy. The SAFE steering committee is taking steps to advocate for an institutional presence for energy in the UN humanitarian system. As they are doing so, the core agencies are also improving their understanding of and capacity for working on these issues. The ongoing modernization of managing and reporting structures could favour the introduction of specific indicators, thereby enabling a closer monitoring of energy projects and costs related to powering operations. Furthermore, there has been an increase in dedicated technical resources and personnel who specialize in sustainable energy. On top of all this, the scale-up of

cash aid and voucher approaches in camps can enable the integration of market dynamics into camp economies and the creation of enterprises.

However, despite these positive trends, barriers to the uptake of sustainable energy solutions and the realization of this vision include:

- The lack of an institutional presence for energy, resulting in poor coordination on the ground; weak recognition of energy as a fundamental need and thus smaller allocations of funds; reporting frameworks and indicators that do not provide information about the sustainability of initiatives (costs, efficiency, durability); a lack of accountability, as no agencies can be considered directly responsible for addressing energy needs; and a constrained vision drawn from an environmental/protection background.
- Funding mechanisms restricted to short-term responses both in time and in budget lines.
- Rules and practices that result in weak engagement with the business sector and take-up of market-based approaches in favour of the distribution paradigm and unsustainable NGO-led projects.

Further research could focus on:

- Developing a thorough understanding of funding mechanisms, in particular the interactions between donors and implementing agencies.
- Conducting a field assessment of energy camp dynamics: existing procurement of energy goods and services, power generation, a map of unmet or unsustainably met energy needs, host community markets and energy needs, local and national authorities' priorities, opportunities for energy-powered services and so forth.
- Proposing ways in which the humanitarian sector can support existing enterprises in scaling up their business with cost-effective and sustainable production methods, for example by means of 'incubators'.
- Adopting new indicators and reporting frameworks for highlighting the impacts and results of sustainable-energy solutions.
- Conducting a field investigation of innovative technologies and promising delivery models so as to assess degrees of success and to understand challenges and replicability in different contexts.
- Capitalizing on databanks of digital purchase transactions in camps in order to conduct market analyses.

Annex A: Case Study Santo 17

Early on in the interviews for this study, scattered details started to emerge about the existence of the Santo 17 camp in Haiti. Respondents from the IOM referred to it and provided as much material as they could retrieve. However, the attempt to gain insights from the implementing organizations concerned with its energy components, particularly biogas, was unsuccessful. This is unfortunate because it could have provided a better understanding of the restrictive factors encountered during implementation that eventually led to the project's failure.

The only way to properly assess the success of a project is to pay a medium- to long-term visit to the site, but this is rarely possible or done. Usually the implementers have left, the project is closed, there are no contacts, no funds, no donors to report to, the area might be mildly unsafe, as it was in this instance. But so much insight could be drawn from independent visits after implementation that designing a project uniquely devoted to that purpose would be worthwhile.

Favourable circumstances allowed the author to pursue this goal in this case and visit the site in person with the help of a Haitian contact and by knowing the name of the local community leader.

Once onsite, it was simple to contact the camp's representatives, who kindly agreed to provide their account of how the energy projects unrolled. They were asked what their impressions were and what, from their perspective, were the biggest weaknesses resulting in the neglect of the biodigesting and mini-grid systems. A small crowd of people participated in the exchange at first, leaving the final word to a couple of representatives. Subsequent discussions touched on the current ways of coping with energy needs in the camp and on the innovative reuse of what was donated.

There were no prepared written questions (as it is difficult to anticipate what will be uncovered), but there was a strong motivation to fully understand what had happened and what the situation is now as perceived by the beneficiaries.

Project description

The International Organization for Migration (IOM), with funds from USAID and the government of Japan, was assigned the task of providing transitional shelter and non-food-item assistance to internally displaced persons (IDPs) whose houses had been destroyed or damaged by the 2010 earthquake. This undertaking affected about 5,000 families and included the establishment of the Santo 17 relocation site, consisting of transitional shelters for 358 IDP families. Project partner agencies (or national counterparts) were the Government of Haiti and the Shelter and CCCM cluster. The project was implemented between February 2010 and January 2012.

The construction of a biodigesting system was included in the project and was installed by the NGO VivaRio, subcontracted by the IOM. It consisted of five biodigesters, 60 sit-flush toilets (12 each per digester, each serving seven families or 35 people) and 13 irrigation pipes to distribute the slurry processed by the biodigester. A community kitchen, connected with plastic pipes to one biodigester, was built for each of the 13 blocks accommodating 40–50 families. Thirty-nine gas burner units

were planned for the system. A mini-grid system was also installed to provide street lighting; it consisted of five units of eight PV panels and eight batteries each.

Visit to Santo 17, August 2014

According to the residents who were interviewed, several issues emerged fairly quickly after the installation of the mini-grid. Cleaning the toilets was originally carried out by VivaRio but the responsibility was eventually to be transferred to the beneficiaries, and this shift proved to be difficult. Many components of what was planned did not work or did not work for much of the time. Thus the biodigesters either were never used or were soon abandoned, people organized their own cooking solutions and kitchens were occupied by families which moved in from their tent after a flood and never left. A number of factors contributed to the failure of the energy elements of this project.

Toilets

Different kinds of toilet were installed, probably by different organizations. The flush toilets were still in use at the time of the visit. Each toilet serves three families (as opposed to the seven originally planned or 15 individuals) and is closed with a lock. The human waste is collected in a unique cesspit. According to the design, this should have been conveyed to the biodigesters to produce biogas. But as this never really worked, the cesspit was emptied regularly by the Haitian company Jedco Services SA, paid by the IOM. With donors' funds running out, this has now stopped. The camp committee leaders therefore decided to dig a second pit to divert the flux.

Respondents reported that the toilets' hygienic conditions were poor, for several reasons. First, as there is no water-collection tank piped to the toilets, each person must bring his or her own water to flush after use, which can lead to people not flushing at all. Water unavailability is also an issue for cleaning because it is necessary to carry water in buckets all the way from the well several hundred metres away. Moreover, proper cleaning requires products and tools such as gloves, brushes and disinfectants. This cost is not trivial, and families need to agree upon sharing. Having become used to receiving goods and services over the past four years, camp residents are reluctant to take responsibility and pay. Finally, labour for cleaning can also be an issue, as it requires negotiation between families; and varying levels of thoroughness in performing the task can lead to tensions. Sit toilets are arguably unsuited to this role and are potentially unhealthy and unhygienic in the circumstances.

In addition to the 60 flush toilets, there are other pit toilets in the camp. Pit toilets need regular emptying. As with the flush toilets, this service had previously been paid for by donors. But now that most projects have come to a close, it needs to be paid for. The committee is trying to get the DINEPA (local water authority) to provide the service free of charge.

Kitchens

Major design mistakes were made in planning the kitchen system. Even assuming a utilization of the plant at maximum capacity, the amount of gas produced would not have been enough to serve all the families. And, even more significant, no plan was put in place to regulate access. When families moved into the kitchen's communal space after the flood, they used one of the stoves for their own separate cooking. The practice was discontinued owing to continuous disputes about use of the stove between

the residents of the kitchen. There are also other reasons why the communal kitchen concept was unsuitable to the local context.

Cultural: Haitians normally cook inside the house, if possible, or immediately adjacent to it. To cook in a common space has several disadvantages: privacy – people do not like others to see what they cook; and safety – food unattended could be stolen or altered (voodoo) practices.

Practical: Cooking in the back yard enables people to attend to other chores at the same time; cooking in the communal kitchen forces people to waste two hours or more by staying close to the pot. The most common dish is rice and beans. It is cooked in huge pots, to serve five to six people or more. To move the burning pot filled with cooked rice and beans from the kitchen to the house is difficult.

Technical: Several problems were reported. Just one stove with three burners was installed in each kitchen. It is believed that this was a sample and that more were supposed to come, but this never happened because the kitchens were occupied. The pipes to the stoves cracked soon after installation in several places. The stove had one unique knob for all three burners and no regulation for flame intensity. The knob was easily reachable by small children.

Mini-grid

Solar street lighting was provided by a mini-grid connecting five solar street lamps. The arrangement included five units of four panels per unit and a set of 40 batteries, one for each panel. The solar hub containing all the central equipment was placed in a fenced area protected by barbed wire. After a while, three batteries were stolen and all the others were depleted and never replaced. The system therefore stopped working. All lamp poles except the one enclosed in the solar hub stopped providing light and broke down. Bits and pieces can still be seen in the camp. The remaining solar panels are still there, mostly unused. Meanwhile, those who can afford it satisfy their energy needs at home with their own solar system.

Other initiatives

The remains of other programmes are still visible.

Wells and water pumps: There are three wells in the camp, equipped with water pumps donated by different organizations. Two are manual. One of them is broken and the camp committee is trying hard to collect money for repairs, without success so far. One is powered by three solar panels and eight batteries. The solar pump broke down after less than a year and was never repaired; its solar panels were stolen.

ICS: In 2012, nearly one stove per family of the EcoRecho model was distributed to IDPs. Respondents said that they appreciated the advantages of the stove. For one thing, it allows them to cook in a very small area – ashes are kept inside and there is no smoke and no risk of fire – and it uses less charcoal: 'With one charge, you can make rice and beans and there is still charcoal left to make the sauce as well.'

Further considerations

The energy programmes can be broadly defined as a major failure, but some aspects are not wholly negative and are worth noticing. One set of panels is still in use. It powers the street light inside the fenced area and provides electricity for a phone charging SME. This was made possible by using

the batteries, which became redundant when the solar pump broke, along with one PV unit of eight panels from the street lights mini-grid project. The mobile phone charging service costs residents five HTG per charge. The panels also power a music-player used to attract clients to the shop.

Gas stoves were reused as tables. Improved charcoal stoves were appreciated and are still used.

Community leaders indicated an interest in being introduced to new models of ICS for sale. They pointed out that selling in Santo17 is very difficult owing to the expectation of free distribution.

Annex B: Case Study Digicel

Street light mobile phone charging stations

Digicel[13] is an international telephone company of Irish origin. It is present in 32 markets in the Caribbean, Central and South America and the South Pacific. It is also present in several other markets in Africa and Asia. In Haiti just after the earthquake, Digicel developed solar-panel-powered street light units that were equipped with sockets to charge mobile phones and car batteries, the most-used electricity storage device in the country. The station would at the same time render a service to the community by lighting the street and generating income for the operator.

Although the initiative came at the time of the earthquake, Digicel's primary motivation was not humanitarian. Its rationale was to increase customers' phone use by expanding the market to rural areas and extending the hours of use in urban areas, known to be limited by lack of charge. Digicel expected to break even in some years and to gain the additional benefits of branding and visibility.

The first three pilot stations were deployed free to use with no operator. However, it was soon realized that people were not taking advantage of this opportunity. Clients preferred to pay for a service whereby they could leave the phone to someone who would look after it for the hours needed for charging rather than to have direct access to a free but unsupervised charging station. The business model was initially conceived to include a small monthly fee for renting the stations, but this was soon modified owing to the additional complications of such an arrangement. The equipment was therefore provided free as long as it was taken care of. The profit for the entrepreneur was about $100–150 per month, comparable with the income of other small vendors. Digicel established 400 stations around Haiti. Some of them were installed near the kiosks selling TopUp mobile phone cards and other goods. An increase in use of the phones was noticed. Another outcome of this initiative was the company's collaboration with the many relief organizations in the country at the time. One service that they found very useful was the sending of mobile texts to beneficiaries for free. Digicel is still supporting state-led social campaigns, the most recent one being the health alert for Chicungugna fever.

A respondent working at the time as clusters coordinator for the IOM reported that some sub-projects included the distribution of SIM cards to camp residents and also telephones to camp leaders. Access to beneficiaries' telephone numbers enabled organizations to reach them with informative messages on many topics and to interact and obtain feedback. For example, they could announce initiatives and send instructions on protection against illnesses such as cholera.

PAYG solar systems

The next venture in the pipeline is the provision of PAYG solar services through a start-up private enterprise called ReVolt. The equipment works with Digicel SIM cards and can be configured to support any other card.

[13] From conversations with Maarten Boute, Chief Executive Officer at Digicel Haiti, and Giovanni Cassani, clusters coordinator (Shelters, CCCM and NFI) for the IOM in 2011–13.

This product is the result of three years of investigation into similar technologies and business models in the market and the development of a partnership with dLight to design a suitable solution. The technology has several advanced features, including the possibility to update the system remotely and to calibrate light bulb intensity according to the level of ambient illumination. The battery contains a microchip that regulates and blocks the supply of energy so as to avoid early exhaustion.

The project is now entering the pilot phase, with 50 families in each of two urban locations in Haiti. The solar system, comprising four light bulbs, a radio, a portable light and a mobile phone charging port, is the entry point to building a relationship with families and to subsequently offering additional services. Once a house has access to electricity, the next step is to introduce a solar system capable of supporting a TV, a cooling fan and Wi-Fi, all working on direct current (DC). The use of DC is required both for efficiency and for controlling the quality of the appliances (assuming DC appliances are a niche product). The range of services grows with the household's increasing purchasing power, eventually enabling Digicel to sell broadband for internet services and cable TV subscriptions. The biggest constraint upon the expansion of these services is power. The service is sold by sales agents, who register new users and sell the services according to the family's purchasing power and the applications demanded. An initial deposit of $10 is envisaged to encourage people to take care of the system and to return it for repair or substitution. A suitable monthly fee, which balances profits with affordability, is then required to keep the system working.

Besides making a profit, the rationale for this initiative is to establish a lasting relationship with the customer. Once the system is in place in homes, it opens a variety of other opportunities: the collection of data on consumption habits and purchasing power, remote troubleshooting and so forth. Another very important piece of information in countries where fixed telephones are virtually non-existent and addresses are either not codified or difficult to identify is the GPS position of a home, which a mobile phone would not be able to provide with the same precision. When applied to refugee and IDP camps, it would enable the creation of an emergency button that could transmit an alert and simultaneously communicate the location of the call.

Digicel is going to propose introducing its PAYG solar service in places where the local electricity company EDH has no plans to expand for the next 10 years. It plans to distribute 2,000 units by the end of 2014 and 500,000 in the next five years.

Acronyms

BOO	Build, own, operate
BRABATT	Brazilian Battalion
CAR	Central African Republic
CCCM	Camp coordination and camp management
CVR	Community violence reduction
DFID	UK Department for International Development
DFS	Department of Field Support
DPKO	Department for Peacekeeping Operation
DRC	Democratic Republic of the Congo
DRC	Danish Refugee Council
EDH	Electricité d'Haïti
EDM	Entrepreneurs du Monde
EMMA	Emergency market mapping and analysis
ESDC	UN Logistics Base's Engineering Standardization and Design Centre
FAES	Fond d'Assistance Economique et Social
FaIDA	Fafi Integrated Development Association
FAO	Food and Agriculture Organization
GACC	Global Alliance for Clean Cookstoves
GNI	Gross National Income
GoH	Government of Haiti
HIP	Humanitarian Innovation Project
HTG	Haitian Gourde (currency)
IASC	Inter-Agency Standing Committee for Humanitarian Assistance
ICS	Improved cookstove
ICT	Information and communications technology
IDP	Internally displaced person
IES	Institute for Environmental Security
IFRC	International Federation of Red Cross and Red Crescent Societies
ILF	International Lifeline Fund
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
IRC	International Rescue Committee
ITDG	Intermediate Technology Development Group
IUCN	International Union for Conservation of Nature
LPG	Liquefied petroleum gas
MDG	Millennium Development Goal
MINUSTAH	United Nations Stabilization Mission in Haiti
NFI	Non-food item
NGO	Non-government organization
NRC	Norwegian Refugee Council
PA	Practical action

PAYG	Pay as you go
PV	Photovoltaic
RCE	Refugee camp entrepreneur
SAFE	Safe Access to Fuel and Energy
SDG	Sustainable development goal
SE4All	Sustainable Energy for All
SME	Small and medium-sized enterprises
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNGM	United Nations Global Marketplace
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNIFIL	United Nations Interim Force In Lebanon
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
USAID	United States Agency for International Development
WASH	Water, sanitation and health
WFP	World Food Programme
WRC	Women's Refugee Commission

Interviewees

Interviews were held with 31 actors, from UN agencies (five), international NGOs (eleven) and donor-government agencies (three) to academia (one), independent consultants (two), the private sector (five), local government (one) and end-users (three). They included: Adeline Carrier (UNHABITAT), Andrew Morton (UNEP), Clementine Lalande (Yunus Social Business), Corinne Hart (GACC), Chris Porter (DFID Kenya), Eleanor Baha (Foreign & Commonwealth Office), Elisha Moore Delate (Mercy Corps), Ernest Achtell (DFID Kenya), Giovanni Cassani (IOM), Howard Rush (Brighton University), Jaquelyn Amoko (MINUSTAH), Jean-Christophe Duchier (EDM), Jonas Tjäder (Independent), Katherine Arnold (GACC), Maarten Boute (Digicel), Mariachiara Benedetto (De Nora S.P.A.), Megan Gerrard (WRC), Michael Kelly (WLPGA), Nicole Klaesener-MIetzner (IOM), Paul Spiegel (UNHCR), Sahdia Kahn (Urban planning consultant to the Government of Haiti), Tasso Kioses (MINUSTAH), Tobias Metzner (IOM), Tom Adamson (Micama Soley), Vahid Jahangiri (ILF), Valeria Falaschi (IOM/ MINUSTAH) and Michelle Lacourciere (Sirona Haiti S.A.).

References

Army Environmental Policy Institute (2006), *Sustain the Mission Project: Resource Costing and Cost-Benefit Analysis* (Arlington, VA: Army Environmental Policy Institute).

Bellanca, R., Bloomfield, E. and Rai, K. (2013), *Delivering Energy for Development*, Practical Action Publishing, at http://developmentbookshop.com/delivering-energy-for-development.

Bellanca, R. and Garside, B. (2013), *Designing Energy Delivery Models that Work for People Living in Poverty*, CAFOD and IIED, at http://pubs.iied.org/16551IIED.html.

Bessant, J., Ramalingam, B., Rush, H., Marshall, N., Hoffman, K. and Gray, B. (2014), *Innovation Management, Innovation Ecosystems and Humanitarian Innovation*, Literature Review for the Humanitarian Innovation Ecosystem Research Project.

Betts, A., Bloom, L., Kaplan, J. and Omata, N. (2014), *Refugee Economies: Rethinking Popular Assumptions*, Humanitarian Innovation Project, University of Oxford.

De la Chaux, M. and Haugh, H. (2014), 'Entrepreneurship and Innovation: How Institutional Voids Shape Economic Opportunities in Refugee Camps', Judge Business School, University of Cambridge.

DPKO (2009), 'Our Approach', at http://www.un.org/en/peacekeeping/issues/environment/approach.shtml.

EMMA (2009), 'Emma Emergency Market Mapping and Analysis Toolkit', at http://emma-toolkit.org.

ERM (2007), *Mainstreaming the Environment into Humanitarian Response: An Exploration of Opportunities and Issues,* Environmental Resources Management (London: ERM), at http://www.gdrc.org/uem/disasters/disenvi/erm-meha.pdf.

ESDC (2013), 'Modularization: Exploring Alternative Options for Sustainable Power Supply in UN Camps', *Engineering Standardization and Design Centre Newsletter*, Vol. 8, pp. 6–7, at http://www.unlb.org/esdc_newsletter.asp?link=esdc_newsletter.asp&=go.

FAO (2013), *FAO in Emergencies: Guidance Note*, at http://www.fao.org/fileadmin/user_upload/emergencies/docs/Guidance%20Note%20Safe.pdf.

GACC (Global Alliance for Clean Cookstoves) (2014), *Humanitarian Engagement: Safe Access to Fuel and Energy (SAFE) in Emergencies*.

Harvey, P. (2005), *Cash and Vouchers in Emergencies*, The Humanitarian Policy Group, ODI.

Harvey, P. (2007), *Cash-Based Responses in Emergencies*, The Humanitarian Policy Group, ODI.

HEDON Household Energy Network (2010), 'Energy in Conflict and Emergency Relief', *Boiling Point*, No. 59.

HEDON Household Energy Network (2014), 'Toolkit: Using the Energy Delivery Model Canvas to Analyse Social Enterprises: A Biomass Briquettes Producer in Haiti', *Boiling Point*, 'Energy Service Delivery Models', No. 63.

HIP (2012), *Humanitarian Innovation Project*, Refugee Studies Centre, University of Oxford, at http://www.oxhip.org.

IASC (Inter-Agency Standing Committee) (2009a), *Matrix on Agency Roles and Responsibilities for Ensuring a Coordinated, Multi-Sectoral Fuel Strategy in Humanitarian Settings. Version 1.1*, Task Force on Safe Access to Firewood and Alternative Energy in Humanitarian Settings, at http://www.humanitarianinfo.org/iasc/pageloader.aspx?page=content-products-products&bodyid=67&publish=0.

IASC (2009b), *Decision Tree Diagrams on Factors Affecting Choice of Fuel Strategy in Humanitarian Settings. Version 1.1*, Task Force on Safe Access to Firewood and Alternative Energy in Humanitarian Settings, at http://www.humanitarianinfo.org/iasc/pageloader.aspx?page=content-products-products&bodyid=67&publish=0.

IASC (2012), *Reference Module for Cluster Coordination at the Country Level*, at https://www.humanitarianresponse.info/system/files/documents/files/iasc-coordination-reference%20module-en_0.pdf.

IES (Institute for Environmental Security) (2009), *Fuel Project: Integrating Energy Needs in Humanitarian Crisis Response Operations*, at http://www.envirosecurity.org/fuel.

IPCC (2014), *Working Group II Contribution to the Fifth Assessment Report*, Assessment Report 5, Working Group 2, Chapter 12 (Human Security), at http://www.ipcc.ch/report/ar5/wg2/.

ITDG (1996), 'Household Energy in Emergency Situations', *Boiling Point*, No. 37.

McCallion, P. (2014), Personal communication with P. McCallion, September.

NRC (Norwegian Refugee Council) (2008), *Camp Management Toolkit*, The Camp Management Project (CMP) Edition May, at www.nrc.no/camp.

OCHA (UN Office for the Coordination of Humanitarian Affairs) (2014), 'Nigeria, Update on IDPs in Camp and Host Communities in Adamawa State Situation Report', *OCHA Nigeria Situation Report*, No. 1, 2 October.

Okoth, D. (2012), 'IT Entrepreneurs Find Surprise Success in Kenya's Dadaab Refugee Camps', *The Guardian*, 4 July, at http://www.theguardian.com/global-development/2012/jul/04/entrepreneurs-kenya-dadaab-refugee-camps.

Omata, N. and Kaplan, J. (2013), 'Refugee Livelihoods in Kampala, Nakivale and Kyangwali Refugee Settlements: Patterns of Engagement with the Private Sector', *Working Paper Series*, No. 95, Refugee Studies Centre, University of Oxford, at http://www.rsc.ox.ac.uk/files/publications/working-paper-series/wp95-refugee-livelihoods-kampala-nakivale-kyangwali-2013.pdf.

Practical Action (2013), *Poor People's Energy Outlook 2012: Energy for Earning a Living*, Practical Action Publishing.

Red Cross and Red Crescent (2011), *The Sphere Handbook: Humanitarian Charter and Minimum Standards in Humanitarian Response*, in The Sphere Project, at http://www.sphereproject.org/handbook/.

SAFE (2007), 'Safe Access to Fuel and Energy', at http://www.safefuelandenergy.org/.

UN (1992), 'IASC – Inter-Agency Standing Committee', at http://www.humanitarianinfo.org/iasc/.

UNEP (1999), 'UNEP Disasters and Conflicts Sub-Programme', at http://www.unep.org/disastersandconflicts.

UNEP (2012), *Greening the Blue Helmets: Environment, Natural Resources and UN Peacekeeping Operations* (Nairobi: UNEP), at http://postconflict.unep.ch/publications/UNEP_greening_blue_helmets.pdf.

UNGM (2013), *2013 Annual Statistical Report on United Nations Procurement* (Copenhagen: UNOPS), at https://www.unops.org/SiteCollectionDocuments/ASR/2013_ASR_UN-procurement.pdf.

UNHCR (1998), *Environmental Guidelines: Domestic Energy in Refugee Situations* (Geneva: UNHCR), at http://repository.forcedmigration.org/show_metadata.jsp?pid=fmo%3A3255.

UNHCR (1998, latest edition 2002), *Refugee Operations and Environmental Management: Selected Lessons Learned* (Geneva: UNHCR), at http://www.unhcr.org/3b03b2754.html.

UNHCR (2002), *Cooking Options in Refugee Situations: A Handbook of Experiences in Energy Conservation and Alternative Fuels* (Geneva: UNHCR), at http://www.unhcr.org/406c368f2.html.

UNHCR (2004), *NGO partnership in refugee protection: Questions and Answers* (Geneva: UNHCR), at http://www.un-ngls.org/orf/HCR-NGO-partnerships.pdf.

UNHCR (2005), *Forest Management in Refugee and Returnee Situations: A Handbook of Sound Practices* (Geneva: UNHCR), at http://www.unhcr.org/438724c42.html.

UNHCR (2005), *UNHCR Environmental Guidelines 2005* (Geneva: UNHCR), at http://www.unhcr.org/3b03b2a04.html.

UNHCR (2007a), *Handbook for Emergencies: Third Edition* (Geneva: UNHCR), at http://www.unhcr.org/472af2972.html.

UNHCR (2007b), *Doing business with the United Nations High Commissioner for Refugees* (Geneva: UNHCR), at http://www.unhcr.org/3b9203194.html.

UNHCR (2009c), *Partnership: An Operations Management Handbook for UNHCR's Partners* (Geneva: UNHCR), at http://www.unhcr.org/4a39f7706.html.

UNHCR (2009d), 'Guidelines on Cooperation Between the United Nations and the Business Sector', 20 November, at http://www.unhcr.org/4b4af4979.html.

UNHCR (2011), *Light Years Ahead: Innovative Technology for Better Refugee Protection* (Geneva: UNHCR), at http://www.unhcr.org/4c99fa9e6.html.

UNHCR (2012), 'Working in Partnership', *UNHCR Global Report 2012* (Geneva: UNHCR), at http://www.unhcr.org/51b1d61eb.html.

UNHCR (2013), 'War's Human Cost', *UNHCR Global Trends 2013* (Geneva: UNHCR), at http://www.unhcr.org/5399a14f9.html.

UNHCR (2014a), *Global Strategy for Safe Access to Fuel and Energy (SAFE): A UNHCR Strategy, 2014–2018* (Geneva: UNHCR), at http://www.unhcr.org/530f11ee6.html.

UNHCR (2014b), 'UNHCR bi-weekly update', *Dadaab Refugee Camps,* Kenya, 16–31 August, at http://data.unhcr.org/horn-of-africa/download.php?id=1443.

UNHCR (2014c), 'Cash Grants Transform Life in Congo Camp for Central African Republic Refugees', *News Stories*, 3 October, at http://www.unhcr.org/542eb0ab9.html.

UNHCR (2014d), *Call for Expression of Interest for the Implementation of the Energy Project Intended to Refugees of Ali Addeh and Holl Holl Camps and Djibouti Urban Refugees*, Ref. 002/HCR/PRG/08/2014. The full text of the call is available from the author on request.

UNHCR (2014e), *Introduction to UNHCR Procurement*, Procurement Management and Contracting Service (PMCS), UN Procurement Seminar 2014, Copenhagen, Denmark, 11–12 June.

UNHCR (2014f), 'Solar Energy and Energy Efficiency', *Dadaab Refugee Camps*, Kenya, September.

UNHCR (2014g), 'Responding to Emergencies', *UNHCR Global Appeal 2014–2015*, p. 34, at http://www.unhcr.org/528a0a120.html.

UNHCR and CARE International (2009a), *FRAME Toolkit: Framework for Assessing, Monitoring and Evaluating the Environment in Refugee-related Operations* (Geneva: UNHCR), at http://www.unhcr.org/4a97d1039.html.

UNHCR and CARE International (2009b), *FRAME Toolkit, Module V, Environmental Indicator Framework* (Geneva: UNHCR), at http://www.unhcr.org/4a97aa3d9.html.

UNIFIL (2011), *State of Environment in UNIFIL Headquarters and Area of Operations Year 2011*.

USAID (2010), *Fuel-Efficient Stove Programs in Humanitarian Settings: An Implementer's Toolkit*, at https://www.k4health.org/toolkits/improvedstoves/fuel-efficient-stove-programs-humanitarian-settings-implementer%E2%80%99s-toolkit.

Van Dorp, M. (2009), *Dealing with Energy Needs in Humanitarian Crisis Response Operations: A Quick Scan of Policies and Best Practices of Humanitarian Aid Organizations and Potential Alternative Energy Sources and Technologies*, Institute for Environmental Security, at http://www.envirosecurity.org/fuel/Quick_Scan_FUEL_project.pdf.

WFP (World Food Program) (2012), *WFP Handbook on Safe Access to Firewood and Alternative Energy (SAFE),* 2012 Edition (Rome: WFP), at http://documents.wfp.org/stellent/groups/public/documents/newsroom/wfp252989.pdf.

WFP and WRC (2010), *Cooking Fuel Needs in Haiti: A Rapid Assessment* (New York: WRC and Rome: WFP), at http://womensrefugeecommission.org/resources/document/612-cooking-fuel-needs-in-haiti-a-rapid-assessment.

WRC (Women's Refugee Commission) (2006), *Beyond Firewood: Fuel Alternatives and Protection Strategies for Displaced Women and Girls* (New York: WRC), at http://www.womenscommission.org/pdf/fuel.pdf.

About the Author

Raffaella Bellanca is an access to energy consultant, focused on pro-poor energy delivery models and the development of sustainable value chains. She recently co-authored a book entitled *Delivering Energy for Development* (with Ewan Bloomfield and Kavita Ray, Practical Action Publishing, 2013) and a guideline tool on 'Delivery Models that Work for People Living in Poverty' (with Ben Garside, IIED and CAFOD, 2013).

For the past two years she has been Country Director with International Lifeline Fund in Haiti, working on local production and commercialization of improved charcoal cookstoves. She is trustee of the HEDON Household Energy Network, publishers of the peer-reviewed journal *Boiling Point*, which she led in the past. Before working in international development she researched combustion processes in power plants and car engines and also worked as a cleantech entrepreneur experiencing start-up company incubation at first hand.

She holds a PhD in Combustion Physics, an MSc in Environmental Physics and a Master's in Communication for Development.

Acknowledgments

This paper benefited greatly from the insightful comments of Rob Bailey, Sarah Lester, Corinne Hart and Samuel Perkins, from continuous exchanges with Rebecca Gunning, the valued assistance of Owen Grafham and the discussions of research findings at the Chatham House 'Moving Energy Initiative' workshop held on 2 September 2014. Any errors or omissions remain the sole responsibility of the author. Grateful thanks are also extended to those who participated in research interviews, which were instrumental in shaping the ideas presented in this paper. Funding for the preparation of the paper and the workshop was provided by the UK Department for International Development.

Independent thinking since 1920

The Royal Institute of International Affairs
Chatham House
10 St James's Square, London SW1Y 4LE
T +44 (0)20 7957 5700 F +44 (0)20 7957 5710
contact@chathamhouse.org www.chathamhouse.org

Charity Registration Number: 208223