

Research Paper

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Refugees and Energy Resilience in Jordan



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Preface

This research paper has been prepared by Chatham House and the West Asia-North Africa (WANA) Institute and has been made possible by support provided by the Ministry of Foreign Affairs of the Netherlands. The paper aims to highlight some of the projects that are attempting to overcome water and energy challenges, which have emerged – and deepened – in the wake of the Syrian refugee crisis. It is based on a summary that reflects the challenges and solutions that participants discussed during a workshop held in Amman on 19–20 April 2016, and also builds on an internal background paper presented in advance of the same workshop. This work is being undertaken as part of the Moving Energy Initiative (MEI) – an international partnership that began in 2015 to promote sustainable energy delivery in situations of forced displacement. This entails not only a shift to cleaner energy sources and services for refugees but also projects that bring benefits to host countries and communities and incorporate plans for sustainable finance.¹ Jordan is one of the focus countries for the MEI for 2016–17.

¹ Lahn, G. and Grafham, O. (2015), *Heat, Light and Power for Refugees: Saving Lives, Reducing Costs*, Chatham House Report, London: Royal Institute of International Affairs, <https://www.chathamhouse.org/sites/files/chathamhouse/publications/research/2015-11-17-heat-light-power-refugees-lahn-grafham-final.pdf> (accessed 16 Mar. 2016).

Executive Summary: A Resilience Approach to a Long-term Crisis

Jordan has welcomed hundreds of thousands of refugees since it gained independence in 1946, with the majority of them successfully integrating into the country's vibrant, peaceful society. The latest and largest rise in Jordan's population resulting from the Syrian crisis beginning in 2011 (variously estimated at 7–14 per cent), has inevitably increased pressures on public services and already strained water and energy resources. Fuel, power and water use have risen sharply since 2011, as have subsidy bills for the government. Simultaneously, public facilities are costing more. State schools, for example, must run double shifts to cope with the demand, doubling their electricity and water bills for the Ministry of Education. Low- to middle-income Jordanians are feeling the pressure from inflation, a housing shortage and unemployment, all of which are perceived to be exacerbated by Syrian and Iraqi refugees and the influx of foreign aid agencies. Meanwhile, the majority of Syrian refugees are living below the country's poverty line. Most live in towns and cities, with households spending a high proportion of meagre and dwindling incomes on energy and water. Access to power and clean water in the camps, coping with extremes of temperature and rising costs of energy for the humanitarian agencies remain issues of deep concern.

Recent research on energy use in large-scale refugee crises globally has shown that planning is usually ad-hoc and focused on short-term aid delivery, and often damaging to local environmental and market conditions (Lahn and Grafham 2015). Jordan is exceptional in having national response and resilience plans aimed at channelling aid and financing to enable it to manage these pressures as well as improve the lives of both refugees and Jordanians. This is a new approach with relevance to other countries facing similar circumstances, particularly Lebanon. Based on discussions at an expert workshop on *Refugees and Energy Resilience in Jordan*, held in Amman in April 2016, this report discusses how foreign assistance and partnerships might most effectively achieve energy objectives in ways that contribute to social cohesion and long-term sustainability. The experience and views documented add to a nascent understanding of how humanitarian actors should engage in the face of a large-scale refugee settlement in urban areas.

Maximizing opportunity

Participants with experience of other crisis situations agreed that Jordan was better equipped than many countries to handle the inflow of refugees. It also stands to benefit from intense international interest and long-term assistance partnerships. This is not to say that humanitarian or development approaches offer any alternative to a political solution to the Syrian crisis, or to the fairer sharing of displaced people in the region. Nonetheless, with no expectation of the former in the near future and the latter dependent on Arab League or other diplomatic channels, participants agreed that this presents an opportunity for Jordan in the meantime.

With respect to energy investments, Jordan has significant advantages over its neighbours. These include: a legal framework for the promotion of energy efficiency and renewable energy, a

progressive tariff regime, and the presence of an active national private sector and solar PV expertise. There was unanimous agreement that it would be a waste not to guide assistance to improve the country's infrastructure and markets in a way that builds greater resilience to shocks and independence from aid. Although the issue is fraught with political sensitivities, it was also widely agreed that it would be a waste to leave Syrians dependent on an informal market that undercuts Jordanian wages and not to harness their skills as well as improve their ability to pay for services. The Jordan Compact, following the February 2016 London donor conference, promised measures that could lead to 200,000 jobs for Syrians in the coming years.² Improved and more affordable energy delivery would help increase productivity and private-sector opportunities and some energy resilience projects could offer training and job opportunities for both Jordanians and Syrians.

A growing bank of experience

The Jordan Response Plan (JRP) tables investments and funding needed over three-year timeframes. Three energy-sector specific objectives – offsetting incremental energy demand, promoting energy efficiency and renewable energy technologies, and providing safe sustainable energy for refugees and Jordanians – are listed in the current JRP, together with the estimated costs of achieving these outcomes, a total of some USD 300 million between 2016 and 2018.

While the current status of progress on these objectives remains unclear, there is an array of ongoing initiatives in energy and water resilience in Jordan. A separate appendix to this report, which maps 57 internationally funded projects in which humanitarian, development and climate-oriented financing often overlapped, is available on request from the authors. These projects include offering solar water heater (SWH) installation to landlords hosting vulnerable refugee families in return for a reduction in their rent, retrofitting and solarizing places of worship and schools, and a solar farm to serve both Azraq refugee camp and the surrounding villages, a waste water treatment plant at Mafraq and long-standing work with community based organizations to increase efficient use of water and develop national markets for energy efficiency.

These projects variously aim to leave a positive legacy for the country that transcends the refugee crisis, spread awareness of the benefits of efficiency and renewable technologies, promote local green collar jobs and markets and kick-start sustainable financing models. Together they provide a rich bank of lessons that could be applied in similar contexts such as Lebanon. Yet, current work and goodwill remains a drop in the ocean compared with what is needed. Challenges include enhancing clarity and avoiding delays when approving projects, integrating renewables into the national grid, finding practical models of enabling energy investments for low-income households given the subsidy system, and finding ways to enable payment in the camps where refugees lack legal status and populations may be transient.

² The government of the United Kingdom (2016), *The Jordan Compact: A New Holistic Approach between the Hashemite Kingdom of Jordan and the International Community to deal with the Syrian Refugee Crisis*, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/498021/Supporting_Syria__the_Region_London_2016_-_Jordan_Statement.pdf (Accessed 25 Jul. 2016).

General recommendations for Jordan and similar situations

It was agreed that in a situation like Jordan's, the energy and water challenges facing refugees cannot be separated from wider national needs. Humanitarian agencies emphasized the need to ensure that: 'the infrastructure left behind supplements and complements the existing grid and mitigates the impact of additional population pressures'.³ There was interest in how decision-makers in the humanitarian sector could evaluate the best way to support refugee families' welfare with regard to energy: concentrating on providing for individual needs or contributing to national energy infrastructure?

Humanitarian agencies may not be the best equipped to initiate or manage new energy/water projects. Rather, scaling up what is already being proven successful may offer the most cost-effective option. In this sense, participants agreed that the following would be useful:

- A mapping of ongoing projects, their implementers, financiers and status with a hub through which potential donors can be aware of which projects requires further funding and what the outcomes of these projects are.
- Clarifying the blocks (legal, political, administrative, supply chain) to implementation or scale up of successful projects and cooperation to clear them.

For new initiatives, programmes should work in tandem with ongoing initiatives, which prepare for long-term sustainability. That could mean supporting opportunities for growing the local market, finding practical financing models for increased uptake of new services and technology and helping to build government capacity in key areas, such as building code enforcement and sustainable urban planning. In this way, humanitarian actors can at least mitigate the energy and environmental footprint of the refugee crisis in a country, and at best make a net positive contribution to the host country's long-term development goals.

Specific recommendations for implementation of the JRP

Aid pledges from donors and FDI could achieve multiple benefits through funding infrastructure projects and strategic sectors identified in the JRP, including water, energy efficiency, renewable energy and green construction. There were strong calls for government to remove bureaucratic barriers to JRP energy-related project implementation. This would mean clear, long-term policies on wheeling and tariffs to enable the scale up of renewable energy investments, greater attention on enforcing efficiency standards and potentially the appointment of a champion to help expedite strategic projects. Participants agreed that energy interventions should, where possible, adopt an efficiency-first focus. Humanitarian, development and private sector partners were urged to cooperate to pick 'low-hanging fruit' such as water distribution repair, insulation, LEDs, SWHs in a way that engages and helps build the local market and reinforces ongoing efforts on enforcing building codes, standards and regulations.

³ Workshop participant cited during the 'Refugees and Energy Resilience' Workshop held in Amman, Jordan, on 19–20 May 2015; henceforth referenced as 'Workshop participant (Amman, 19–20 May)'.

1. Introduction

The kingdom was already on the path of unsustainable energy use even before the crisis [...] refugees have shown us the cracks in our energy system.⁴

The population of Jordan has increased drastically over the past five years – largely due to the outbreak of unrest and war in Syria and Iraq.⁵ With the population of some governorates rising by 30 percent in a matter of three years, increased demand for energy and water and other public services that require these resources is putting a strain on national infrastructure. The sudden increase in demand from low-income households in an already resource-constrained country both poses a challenge for energy planners – particularly for the power and water sectors – and adds to the subsidy bill for government.

For vulnerable refugee families, energy is a vital element of protection and dignity. Syrian refugee households in towns and cities are estimated to use around 25 percent less energy than the general population with some suffering from extreme temperatures in winter and summer.⁶ Access to power and clean water – the supply of which is closely interlinked with energy use – is an issue of acute concern. For example, informal camps in Rukban and Hadalat on the border with Syria (see Box 1) were at the time of writing receiving a ration of between 5 and 13 litres of water per person per day, well below the UN Refugee Agency (UNHCR) standard of 20 litres.⁷ In the UNHCR administrated camps there have been problems with unplanned expansion of demand as well as negative impacts on health and livelihoods from a lack of power. The humanitarian agencies managing or serving camps have found themselves facing unsustainable costs for energy. Perceptions of additional pressures on limited energy and water resources have implications for social cohesion. In urban areas where the majority of Syrian refugees reside, the strain on energy and utilities is a factor that can affect relations between the host community and refugees, particularly regarding potential tension between landlords and tenants.

Jordan is exemplary in having adopted a national response plan that recognizes the need for aid and financing to bridge humanitarian relief and longer term resilience. This plan targets energy investments with the aim of bringing them in line with the country's development objectives. In light of the potential usefulness of this experience, not just to Jordan but also to the wider neighbourhood affected by the Syria and Iraq refugee crises, this paper draws on intensive discussions with relevant government, UN, local and international NGO and business stakeholders

⁴ Workshop participant (Amman, 19–20 May).

⁵ Participants in the workshop were divided on the accuracy of population statistics. The latest national census estimates the total population to be around 9.5 million people. See Ghazal, M. (2016), 'Population stands at around 9.5 million, including 2.9 million guests', *The Jordan Times*, <http://www.jordantimes.com/news/local/population-stands-around-95-million-including-29-million-guests> (accessed 6 May 2016); while the United Nations Population Division estimates the population at the end of 2015 to have been 7.6 million: UN Department of Economic and Social Affairs, Population Division (2015), 'World Population Prospects, the 2015 Revision', <http://esa.un.org/unpd/wpp/Download/Standard/Population/> (accessed 6 May 2016). Complete accuracy on this question is difficult but all projections have shown rapid growth in light of recent migration.

⁶ NATO Euro-Atlantic Disaster Response Coordination Centre (2013), *EADRCC Situation Report 13, Syrian Refugees in Jordan*, <http://www.nato.int/eadrcc/2012/09-syrian-refugees/OPS-EADRCC-2013-0202.pdf> (accessed 13 May 2016).

⁷ Private communication with UNICEF, July 2016. This is energy intensive water; it requires around 40 tanker roundtrips per day from the Ruwashed water treatment plant, some 634,000 km per day in total. Based on a new tanker using 22 litres of diesel per 100 km, this would require almost 2,250 litres of diesel per day, although efficiencies of older vehicles are likely to be lower.

in Jordan to give an overview of approaches, problems and lessons learned in this endeavour. It concludes firstly with recommendations based on Jordan's experience that may also be relevant for other countries affected by the Syrian and Iraqi refugee crises or other middle-income countries hosting large numbers of urban refugees; and secondly with recommendations on how stakeholders can achieve the energy-related goals of the JRP.

2. Jordan's Energy Landscape and the Impact of the Humanitarian Crisis on Energy and Water

It shouldn't be only Jordan who copes with this burden.⁸

Jordan relies on imports for around 96 per cent of its fuel demand, a situation that has worsened since the loss of cheap Iraqi oil in 2003 and disruptions and reductions in the gas supply from Egypt since 2012 (through attacks on the Arab Gas Pipeline and shortages). Jordan's population has nearly universal access to electricity, and this supply has been generally stable in recent years.⁹ Yet meeting this increased demand, while holding domestic prices low, has incurred rising costs for the government. Total primary energy demand has more than doubled in the last two decades and 'the current crisis has vastly increased the need'.¹⁰ Although the normal load in Jordan has been around 2,600MW¹¹ – a relatively small amount – electricity consumption driven by domestic household use was rising at an average of 8 per cent per annum in the pre-crisis period 2005–2010.¹² Curtailed gas supplies combined with an increase in oil prices led to a rise in fuel subsidy bills for government and billions of dollars of debt for state utilities, which had to pay independent power producers for diesel and heavy fuel oil generation.

Water resources, too, are strained and services (pumping, treating, trucking and waste water collection) are tightly interlinked with energy demand. One participant suggested that demand for water had increased by 22 per cent across Jordan, and in northern governorates, by over 40 per cent.¹³ Mercy Corps suggests that the average family in areas hardest hit by the refugee crisis are consuming only around 30 litres of water per day (below the 80 litres considered necessary for the average Jordanian).¹⁴ More broadly, the amount of renewable water available per capita has decreased steadily since 1946.¹⁵ Furthermore, Jordan is ranked third in the list of most water scarce countries in the world,¹⁶ and the country faces 'absolute water shortage' by 2025 on current trends.¹⁷ Both the quality of rivers¹⁸ and depleting ground water¹⁹ are also of concern. The Water Authority of Jordan is the largest consumer of electricity and consumes 14 per cent of total

⁸ Workshop participant (Amman, 19–20 May).

⁹ Leaving aside blackouts due to the gas cut off from Egypt.

¹⁰ Workshop participant (Amman, 19–20 May).

¹¹ See for example: Azzeh, L. (2015), 'Load on national power grid reaches "unprecedented" 3,185MW as heatwave continues', *The Jordan Times*, 2 August 2015, <http://www.jordantimes.com/news/local/national-power-grid-reaches-unprecedented%E2%80%99-3185mw-heatwave-continues#sthash.17kyjQcV.dpuf> (accessed 13 May 2016).

¹² Ministry of Energy and Minerals (2009), Annual Report 2009, p.35, <http://www.jordaneceb.org/library/634448546702153750.pdf> (accessed 10 July 2016); National Electric Power Company (2013), Annual Report 2013, p. 17, <http://www.jordaneceb.org/library/634448546702153750.pdf> (accessed 10 Jul. 2016).

¹³ Workshop participant (Amman, 19–20 May).

¹⁴ Mercy Corps (2014), *Tapped Out: Water Scarcity and Refugee Pressures in Jordan*, p.4, http://www.mercycorps.org.uk/sites/default/files/MercyCorps_TappedOut_JordanWaterReport_March2014.pdf (accessed 3 Jun. 2016).

¹⁵ Rai, K. (2015, unpublished). Although one workshop participant also highlighted that the per capita resources available had dropped from 3,500 m³/inhab/yr in 1947 to 90 in 2016.

¹⁶ Maplecroft Water Security Index (2015), https://www.maplecroft.com/about/news/water_security.html (accessed 6 May 2016).

¹⁷ USAID (2016), *Sustainable Agriculture and Water Management*, <https://www.usaid.gov/jordan/sustainable-agriculture-and-water-management> (accessed 3 April 2016).

¹⁸ *Jordan River Commission, Water Quality and Quantity*, <http://jordanrivercommission.com/water-quality-and-quantity/> (accessed 3 Apr. 2016)

¹⁹ See for example, Venot, J.P. and Molle, F. (2008), 'Groundwater Depletion in the Jordan Highlands: Can Pricing Policies Regulate Irrigation Water Use?', *Water Resources Management*, 22(12): pp. 1925–41 (accessed 3 Apr. 2016).

electricity in the country. In Irbid, for example, utility Irbid District Electricity Company (IDECO) diverts a quarter of energy supply to water pumping alone. Many residents must buy water trucked to their properties, increasing the cost and emissions from transportation. In spite of a well-functioning water treatment system, physical and administrative water losses are a problem and are estimated by sources in government to have accounted for as much as 50 per cent of supply.²⁰

Water is effectively rationed for many and households in Jordan tend to be aware of water efficiency and use water conservatively.²¹ While agriculture accounts for 60 per cent of water use in the country, there are attempts to shift farming toward less water-intensive crops. In 2013, Jordan began conveying water from the Disi Aquifer (shared with Saudi Arabia) in the south, 325km to Amman and then to other urban areas. There are also plans to bring new supplies from a desalination plant at Aqaba and increased purchases of lake water from Israel for the north (the latter as part of the 'Red Sea-Dead Sea Canal' project). Nevertheless, these projects require energy (for desalination and pumping long distances) and entail substantial environmental risks. While rainwater collection is being experimented with on a local level, and international organizations and NGOs are giving grants for these purposes, greater investment in rainwater collection, river ecosystem rehabilitation and waste water treatment are urgently needed.

In response to energy security concerns and Jordan's crippling subsidy bill, the country issued the Renewable Energy and Energy Efficiency Law (2012) focused on diversifying its energy mix and promoting renewable technologies. The government also enacted major energy subsidy reforms, raising the prices of transport fuel and electricity. With rich renewable energy potential, the Ministry of Energy and Mineral Resources (MEMR) expects renewables to cover 10 percent of their energy demand by 2020 – as of 2015, the figure stood at 2 per cent but participants noted that with current deployment taken into account, it is likely to be close to 7 per cent by the end of 2017.²² Indeed, according to the National Energy Strategy for 2007–20, Jordan plans to develop some 600MW of wind projects²³ and 600MW of solar generation by 2020. Alongside this, Jordan targets an increase in national energy efficiency of 10–20 per cent by 2020. A National Energy Efficiency Action Plan (NEEAP) was launched in 2013 to identify interventions needed.

²⁰ Ministry of Planning and Cooperation (2013) cited in Mercy Corps (2014), p. 17.

²¹ Several organizations have reported that there is something of a 'cultural clash' with Syrian refugees in this matter, since Syria traditionally has experienced a much more plentiful supply of water. See Mercy Corps (2014), p. 22.

²² Workshop participant (Amman, 19–20 May).

²³ Originally this was intended to be developed by 2015 but some delays have occurred due to the capacity of the grid to absorb renewables. The country's first utility-scale installation, a 117-MW plant at Tafilah, went online in September 2015. The government has also approved the construction of five wind power plants totalling 315MW – which are likely to be finished by around 2019. These include: an 82-MW plant at Al Rajef developed by local firm Green Watts; 45MW at Al Ibrahimiyya, developed by Hecate Energy of the US; 49.5MW at Tafilah, by Xenel Group of Saudi Arabia; and a 49.5-MW project also in Tafilah, developed by the Korea Southern Power Company. The fifth project, comprising 89.1MW at Al Fujeij, dates from a tender launched in 2010, and subsequently awarded to Korea Electric Power. See more at Knight, L. (2015), 'Jordan's windy solution', *Wamda*, 8 September 2015, <http://www.wamda.com/memakersge/2015/09/jordan-windy-solution-infographic> (accessed 12 Apr. 2016).

Box 1: The Syrian refugee situation

As of March 2016, there are approximately 636,000 Syrians (6.7 per cent of Jordan's population) formally registered by UNHCR although the Jordanian government considers a more realistic number to be 1.27 million Syrians (13.7 percent of Jordan's population).²⁴ Nearly 83 per cent of these refugees are living among host communities, outside of the designated refugee camps.²⁵ Most Syrian refugees live in Amman (28 per cent), Irbid (22.7 per cent), Mafraq (12.2 per cent) and Zarqa (8 per cent).²⁶ In some municipalities, such as Al Tayba and Al Jadeedah, Syrian refugees make up as much as 57 per cent of the population.²⁷ The latest UNHCR data also suggest more than half of Syrian refugees are under 35 years of age while 23.5 per cent are women and 51.7 per cent are children.²⁸

The largest refugee camp, Zaatari, houses approximately 79,500 Syrians and is now the fourth largest concentration of people in Jordan²⁹ while the other major refugee camp, Azraq, hosts around 51,000 people.³⁰ There is also the Marajeb Al Fhood 'Emirati camp' hosting around 4,000 refugees with special needs and the transit centres at the border with Syria in Mafraq governorate.

Informal camps, including Rukban and Hadalat have emerged in a no-man's land close to Jordan's northeast border with Syria (the Berm). While numbers are not stable, UN agencies estimated that there were around 55,000 people in Rukban and 12,000 at Hadalat in June 2016.³¹ There are no authorities in charge of these camps and security and living conditions there are reported to be extremely difficult.³² Homelessness and poor shelter in the informal camps is also an increasing problem with a number of deaths in freezing temperatures reported amongst children and the elderly in the last few winters. Extremes of temperature are of particular concern for refugees trapped in eastern Jordan's informal camps bordering Syria. On 21 June 2016, Jordanian authorities sealed the border following a terrorist attack.³³

The majority of Syrians in Jordan are poor, and their conditions have been worsening as the crisis continues. Around 70 per cent are living below the poverty line and as the years pass by many families have spent all their savings, sold their valuables or exhausted support from family members abroad.³⁴

²⁴ Which includes those who have chosen not to register with the UN and those who were living in Jordan before the war. Carrion, D. (forthcoming in 2016), 'Hard Paths Ahead, Syrian Refugees in Jordan', *German Federal Agency for Civic Education*.

²⁵ Ministry of Planning and International Cooperation (MOPIC), Hashemite Kingdom of Jordan (2015), *Jordan Response Plan for the Syria Crisis, 2016–2018, Executive Summary*, p.2, <http://www.jrpsc.org/jrp-publications/> (accessed 13 Apr. 2016).

²⁶ UNHCR (2014), *Living in the Shadows: Jordan Home Visits Report*, <http://www.unhcr.org/jordan2014urbanreport/home-visit-report.pdf> (accessed 13 Apr. 2016).

²⁷ Al Wazai W. Khalid (2014), *The Socio Economic Implications of Syrian Refugees in Jordan – A cost benefit framework*, Konrad Adenauer Stiftung, http://www.kas.de/wf/doc/kas_37808-544-2-30.pdf?140522145513.

²⁸ Ministry of Planning and International Cooperation, Hashemite Kingdom of Jordan (2015), *Jordan Response Plan for the Syria Crisis, 2016–2018*, p. 2, <http://www.jrpsc.org/jrp-publications/> (accessed 10 Apr. 2016).

²⁹ Carrion, D. (2016).

³⁰ UNHCR data as of 1 June 2016, <http://data.unhcr.org/syrianrefugees/settlement.php?id=251&country=107®ion=73> (accessed 12 Jun. 2016).

³¹ Private communication with UNICEF, 28 July 2016.

³² UNHCR (2015), '12,000 people stranded at Syria-Jordan border in deteriorating conditions', UNHCR, <http://www.unhcr.org/5666d4816.html>.

³³ Sweis, R. (2016), 'Jordan Closes Border to Syrian Refugees After Suicide Car Bomb Kills 6', *New York Times*, 21 June 2016, http://www.nytimes.com/2016/06/22/world/middleeast/jordan-syria-attack.html?_r=0 (accessed 23 Jun. 2016).

³⁴ See Verme, P. et al. (2016), 'The Welfare of Syrian Refugee. Evidence from Jordan and Lebanon', The World Bank, <http://www.worldbank.org/en/news/feature/2015/12/16/welfare-syrian-refugees-evidence-from-jordan-lebanon> (accessed 23 Jun. 2016) and Carrion, D. (2016).

Energy issues for urban refugees

There are high levels of economic vulnerability among refugees. Indeed, according to a home survey conducted in 2013/14, two-thirds of refugees live below the Jordanian absolute poverty line of 68 JOD/person/month (96 USD) and their average expenditure is about 1.6 times greater than their income.³⁵ An average of 57 per cent of income goes on accommodation. Spending on liquefied petroleum gas (LPG) for cooking and heating in winter, and electricity for heating water are significant expenses. There has been some assistance with heating costs and blankets for vulnerable families through the 'Cash Working Group' (now renamed the 'Basic Needs Sector Working Group') on the coordination committee (co-chaired by NRC and UNHCR). LPG is the only fuel derivative that remains subsidized by government and, according to the World Bank, Jordan has spent an additional USD 24.9 million on LPG due to the influx of refugees in 2012–14.³⁶ Utility bills (water and electricity) are the main cause of conflict between landlord and tenants (refugees) especially as there is little sub-metering in Jordan and both may share the same building and meter.³⁷ Energy and water costs may be passed onto the tenant through the rent (in which case usage is unclear) or the tenant may be asked to pay part of the household bill. On average, a large (but typical) refugee family (12–15 members) uses more than 300 kWh per month while a small family (two children with a single mother) tends to use less than half that and falls in the lowest tariff category (highly subsidized).³⁸

³⁵ UNHCR (2014).

³⁶ World Bank (2013), *Jordan Economic Monitor, Moderate Economic Activity with Significant Downside Risk*, http://www.worldbank.org/content/dam/Worldbank/document/MNA/Jordan_Economic_Monitor_Fall_2013.pdf (accessed 7 May 2016).

³⁷ Interview with Head of Legal Team, Norwegian Refugee Council, March 2015.

³⁸ Rai, K. (2015, unpublished).

3. Current Approaches to Dealing with the Energy and Water Crisis

In 2013, as large numbers of Syrians continued to seek refuge in Jordan, Lebanon and Turkey – and with no political solution in sight – government, humanitarian agencies and the developmental agencies and NGOs began working together on not just short-term response but also longer-term response and resilience plan. Jordan’s National Resilience Plan (NRP) 2014–16³⁹ is a three-year plan that sought to align humanitarian funding with national priorities in addressing the additional pressures on the country and generate increased support from the international community. The NRP works alongside the 2016–18 JRP – a mid-term rolling strategy that is designed to be reviewed annually.⁴⁰ Although many workshop participants felt that implementation had been somewhat slower than originally envisaged and hoped, many remained positive regarding the direction of current plans. One participant said: ‘We started late, but with the help of many organizations, we are moving in the right direction’.

Energy takes a prominent position within the JRP.⁴¹

In the short term this investment [in renewable energy and efficiency measures] provides a cost-effective solution and significant energy savings, while the long-term benefits of scaling up the use of energy efficient appliances in host communities would outlast the Syria crisis.⁴²

Three energy-sector specific objectives are listed in the current JRP, together with the estimated costs of achieving these outcomes – a total of some USD 300 million.

The Ministry of Planning and International Cooperation (MOPIC) is leading and directing this strategy through the Host Communities Support Platform, which is composed of representatives from relevant ministries, donors, UN agencies and INGOs. The primary targets for assistance are the governorates of Irbid, Mafraq, Amman and Zarqa. The plan states that donors wishing to make financing contributions to the priority areas are invited to make direct contact with the MOPIC.

The NRP’s objectives for energy are in-line with Jordan’s sustainable energy ambitions and its National Energy Efficiency Action Plan (NEEAP). As such, it targets investments for scaling up energy efficient appliances in host communities, cost recovery and energy efficiency measures to reduce consumption and lower electricity bills in both camps and host communities and ‘renewable,

³⁹ MOPIC (2014), ‘National Resilience Plan 2014 – 2016’, http://un.org.jo/uploaded/publications_book/1458650480.pdf (accessed 10 Apr. 2016).

⁴⁰ See also the Jordan Response Platform for the Syria Crisis, www.jrpsc.org.

⁴¹ The JRP represents a three-year programme of high priority interventions to enable the Kingdom of Jordan to respond to the effects of the Syria crisis without jeopardizing its development trajectory. The Platform, chaired by the Minister of Planning and International Cooperation, is the strategic partnership mechanism between the government of Jordan, donors, UN agencies and NGOs for the development of an integrated refugee, resilience-strengthening and development response to the impact of the Syria crisis on Jordan.

⁴² MOPIC (2015), Jordan Response Plan for the Syria Crisis, 2016–2018, p. 5. <http://static1.squarespace.com/static/522c2552e4b0d3c39ccd1e00/t/56b9abe107eaa0afdc35f02/1455008783181/JRP%2B2016-2018%2BFull%2B160209.pdf> (accessed 29 Mar. 2016).

economically sustainable sources of electricity’ to help meet additional demand on the grid nationally.⁴³

Table 1: Financial requirements of JRP energy sector objectives and interventions

	2010 (USD)	2017 (USD)	2018 (USD)	All years (USD)
Sector Goal 1: effective and efficient solutions to offset the incremental energy demand in a sustainable manner	11m	11m	11m	33m
Intervention 1: households receive financing mechanism to adopt energy efficient appliances	8.5m	8.5m	8.5m	25.5m
Intervention 2: promotion programs on the use of thermal insulation in construction	1.5m	1.5m	1.5m	4.5m
Intervention 3: households targeted with information regarding benefits of energy saving practices	1m	1m	1m	3m
Sector Goal 2: introduced and promoted innovative renewable energy and energy efficient (RE & EE) technologies	40.5m	54m	33m	127.5m
Intervention 1: solar water heaters installation	10m	17m	8m	35m
Intervention 2: households provided with energy saving lights	5.5m	7m	5m	17.5m
Intervention 3: Solar PV is promoted in households and institutions, and technicians are trained to operate and maintain solar PV and solar water heating systems	25m	30m	20m	75m
Sector Goal 3: provided refugees and Jordanians with access to adequate, safe and sustainable supply of energy for every household	55.9m	46.1m	43m	145m
Intervention 1: improving access to electricity in Azraq	12.5m	6.9m	5.2m	24.6m
Intervention 2: improving energy access in Zaatari	8.4m	4.2m	2.8m	14.4m
Intervention 3: energy installations upgraded to improve and provide additional electricity supply	35m	35m	35m	105m

Source: MOPIC (2015), Jordan Response Plan 2016–2018, pp. 63–65.

⁴³ MOPIC (2015), p. 31.

4. Ongoing Projects: Challenges and Lessons Learned

So, to date, what does the picture of assistance in the energy-related field look like? Table 2 below provides details of a small selection of the 57 internationally funded projects related to the resilience objectives that we have investigated (although they may not be responding specifically to the JRP). The table gives an idea of the diverse array of approaches and funding streams being applied, covering both specifically humanitarian, and development-directed projects (which may have no reference to refugees and may have begun prior to the 2011 crisis). These variously aim to improve supply, dampen demand and guarantee access for vulnerable populations (refugee and local communities). Workshop participants agreed that this was a valuable resource to help avoid duplication, learn from experience of others and understand where funding could be deployed to scale up successful projects. A small selection of projects is included below in Table 2.

Table 2: A selection of ongoing energy and water projects in Jordan

Project	Project type/ partners	Status	Description	Location
NRC's Solar Schools Project	Humanitarian project (EU funded)	In progress (completion expected at end of 2016)	NRC, in collaboration with the Ministry of Energy and Mineral Resources, is installing solar PV systems in 20 state schools to reduce electricity bills (JOD 400–500 plus per month). Savings will be put into a revolving fund held by the Ministry of Education, and used for school maintenance, including the PV systems. More information at: http://www.nrc.no/jordan#.VwtykkujIU	Irbid, Jerash, Ajloun
Mercy Corps-USAID's community-based initiative for water management	Humanitarian project (USAID funded)	Completed	Initial project (2006–13) was extended to October 2015 in response to Syrian refugee crisis. Technical and financial support was given to 177 community-based organizations (CBO) to help finance water saving projects in host communities (e.g. rainwater harvesting, grey water use, drip irrigation). More information at: https://www.usaid.gov/jordan/factsheets/community-based-initiatives-water-demand-management-ii-cbiwdm-ii	Throughout Jordan (focus on northern area)
Future Pioneers promoting the role of worship houses in the green economy	REEED EU funded, under the supervision of MEMR	Soon to be completed	The project installed PV systems, energy efficiency tools, solar thermal panels and motion detectors for (18) worship houses. Additionally, the project implemented a pilot green Masjid, modified the building code for the construction department at Ministry of Awqaf, and raised the awareness of religious men in general. More information at: http://www.future-pioneers.org/en/water-and-environment/50-	Different governorates in Jordan

fostering-the-role-of-worship-houses-in-promoting-green-economy				
JICA's project for the study of the Electrical Sector Master Plan in the Hashemite Kingdom of Jordan	Development Assistance (JICA, NEPCO, MEMR, EMRC)	In progress (completion expected in March 2017)	JICA is cooperating on a number of projects in electricity including loans, technical cooperation, training programs in Japan, provision of equipment, and development projects. The objectives of the study, which will cover the period 2015–34, are to prepare Jordan's Electrical Sector Master Plan, consisting of a long-term demand forecast, master plan for generation and transmission expansion, strategic environmental assessment, and NEPCO investment plan (aiming at stable and economic electricity supply of Jordan for the long term). More information at: http://www.jica.go.jp/jordan/english/office/topics/c8hovm00008wsa3l-att/press141002_01.pdf	Throughout Jordan
USAID Construction of Mafraq Wastewater Treatment Plant	Development Assistance Veolia (N.A. Water System)	Ongoing	Construction of a waste water treatment plant for Mafraq. More information: https://www.usaid.gov/jordan/fact-sheets/upgrading-mafraq-wastewater-treatment-plant	Mafraq

Source: Chatham House research, also available in full as a separate appendix. Please contact the authors to request the full listing.

National energy infrastructure

The national grid

Structurally, there is currently a limit to integrating variable power sources (such as wind and solar) into the regional grid. Regulation dictates that the capacity of renewable energy going into the distributor network is limited to 1 per cent of the maximum load for the low-voltage side of the network, and 1.5 per cent of the maximum load for the medium-voltage side of the network.⁴⁴ It is estimated that the current grid can support no more than 10 per cent of power from renewable (variable) sources. Participants at the workshop specified that the grid would not accept more than 600MW of variable power sources.⁴⁵ Participants were clear that the national grid presented a significant challenge to delivering sustainable energy solutions in the future. One even said: ‘If Jordan doesn’t upgrade its grid in the next year and a half – there won’t be a renewable energy industry in Jordan’.⁴⁶ Despite this, it was recognized that both the government of Jordan and several international and national institutions (USAID, GIZ, NERC, JICA) are cooperating to

⁴⁴ Rai, K. (2015, unpublished).

⁴⁵ Workshop participant (Amman, 19–20 May).

⁴⁶ Workshop participant (Amman, 19–20 May).

strengthen the grid; much work has been done in assessing the current situation, but upgrading requires a large amount of financing. Overall, there was a sense that the ongoing challenge was primarily in implementation and enforcement of studies that have been commissioned.

Subsidies

The major problem is financing the necessary maintenance and upgrading for utilities in severe deficit. Power in Jordan is expensive for larger consumers using it at commercial rates and the current subsidy regime is widely felt to be a burden to government, business and taxpayers. The government currently supports the lower consumption blocks with an electricity subsidy of 74 per cent to 82 per cent of cost.⁴⁷ There was widespread agreement that the subsidy regime supporting electricity provision to the most vulnerable households needed to be reformed, because of misuse and exploitation, the crippling debt burden of the national electricity company,⁴⁸ and the incentives to inefficient use that such subsidies encourage. Richer households also pay the lower rate for their first blocks of consumption and one participant said that ‘the rich benefit most from the subsidy’.⁴⁹

Jordan wants to create a feed-in tariff to encourage the private sector but several participants pointed to a lack of clarity about selling electricity back to the grid, which needs to be resolved. Grid extension to other countries with complimentary supply and demand profiles would also help increase capacity and efficiency in future.

Finally, several participants suggested that the Central Bank of Jordan has not made requisite capital available to local banks so new energy ventures rely on international banks for access to credit, further restricting the number of new projects.

Urban settings/public facilities

In terms of energy and development initiatives in this area, participants described a number of projects that are attempting to decrease household bills for the most vulnerable people, and simultaneously increase uptake of renewable energy technologies or energy efficiency technologies at the household level. These include installing solar water heaters and solar panels, distributing energy efficient lightbulbs, and water conservation equipment. However, wider application is inhibited by lack of a market for energy efficiency services. A key issue for many organizations working in this area is how to promote such interventions in ways that do not damage local markets and encourage uptake of sustainable energy solutions on a commercial basis. Examples of approaches that integrate these concerns are shown in the Mercy Corps example outlined in Box 2 below.

At the national level, USAID is embarking on a demand-side management initiative with three utilities companies, seeking to provide the right incentives to the distribution companies to encourage investments in demand-side efficiency. It is also working alongside a new business-led

⁴⁷ Workshop participant (Amman, 19–20 May).

⁴⁸ NEPCO, for example, is approximately USD8 million in debt and is now ‘a major problem for the Jordanian economy’ – workshop participant (Amman, 19–20 May).

⁴⁹ Workshop participant (Amman, 19–20 May).

association (a partnership between EDAMA, JGBC and REES) to develop Jordan's energy services market through a system of accreditation for 'energy service providers'.

Right now we have just a handful of companies with the right credentials. 700–800 energy service companies need to be accredited to cater to the business sector.⁵⁰

A successful approach that has been taken-up by a number of organizations is demonstrating sustainable energy solutions inside public institutions. The Future Pioneers have successfully installed solar PV panels on the roofs of 18 worship houses (mosques and churches) across Jordan, while also educating the congregations on the benefits and savings that are generated. The Ministry of Awqaf and the congregation leaders have been strongly supportive of this, given the large electricity bills that these entities incur.

With regard to humanitarian directed initiatives, NRC is taking a similar approach in state schools. An EU-funded project has just begun, having tendered for and chosen a local company to fit solar PV panels on 20 state schools in Amman, Irbid and Jerash. There are large refugee populations in these areas meaning that schools must open for two shifts (one for Jordanians, one for Syrians), thereby doubling their electricity consumption. The payback for some schools (paying JOD 400–500 per month in bills) would be under four years; the savings are planned to go into a Ministry of Education administered revolving fund to install more solar systems in state schools.⁵¹

Both projects seek to reduce bills for the institutions, employ local providers, demonstrate new technology, and educate local populations about the economic and health benefits of sustainable energy.

Box 2: Mercy Corps and market-based approaches through community-based organizations (CBOs)

Mercy Corps has been working to embed energy and water efficiency in Jordanian communities for a number of years. Funded by USAID in Jordan since 2006 through their community based initiative for water demand management (CBIWDM)^a and their measurement and verification (M&V) Pilot Studies,^b the organization uses a revolving loan scheme to subsidize and encourage uptake of technology that promotes water efficiency, solar PV and solar water heaters.

In using market mechanisms to distribute water and energy efficiency technology, Mercy Corps observed that the more upfront costs could be eased so that they were equal to (and looking the same as) a normal household bill, the more likely residents were to be positive about investing. The level of subsidy being applied to the technology was absolutely critical, both in encouraging the initial investment, and in being able to adapt as other prices changed. Their research suggests that for Jordanian households using 600kWh/month or less, a 75 per cent subsidy for PV cells would be needed. For those using between 600kWh and 1,000kWh, this subsidy should be in the region of 20 per cent, while for those using above 1,000kWh, no subsidy was necessary. Mercy Corps also found it crucial that the technology be easy to install and use, and work effectively over time.^c

⁵⁰ Workshop participant (Amman, 19–20 May).

⁵¹ Lahn, G. and Grafham, O. (2015), p.32.

Although the project has been successful, Mercy Corps encountered a number of challenges. Their staff found that setting the right level for the subsidy was very difficult since the most vulnerable populations (whom they wanted to target) were already receiving an 82 per cent subsidy from government on electricity bills. They also found that selling through the CBOs had a natural limit that could probably not be scaled up indefinitely.

Mercy Corps was clear that time was as important as money for residents and 3–5 years was a good period for payback of investments. Funding from donors was said to make the most difference when directed into technology discounts and marketing (agent training, marketing, some space for testing asset finance models etc.).

a) USAID (2016), 'Community-Based Initiatives for Water Demand Management II', <https://www.usaid.gov/jordan/fact-sheets/community-based-initiatives-water-demand-management-ii-cbiwdm-ii> (accessed 5 May 2016).

b) USAID (2014), 'Jordan Energy Sector Capacity Building Activity Quarterly Performance Report, April - June 2014', http://pdf.usaid.gov/pdf_docs/PA00K4XP.pdf (accessed 5 May 2016).

c) Workshop participant (Amman, 19–20 May).

There is a housing shortage in Jordan and tens of thousands of new homes will need to be constructed in the coming years.⁵² In this regard, all participants were clear that capacity-building in energy efficiency, and raising public awareness around housing interventions, are major issues that could benefit the country.

For new buildings, participants agreed that lack of incentives for compliance with existing legislation and lack of enforcement are the biggest issues. There are three types of building regulation, all of which have been created to make buildings more energy efficient and less resource intensive. For example, as of April 2013, all new commercial buildings, flats and homes with an area of 100m², 150 m², 250 m² and greater, respectively, are required to fit SWHs as standard. However, most homes fall outside of this category⁵³ and such regulations are not widely enforced. For example, contracted companies may 'pay a bribe' or 'install a fake SWH' for the purposes of inspection because it is cheaper than buying the proper equipment.⁵⁴ Municipalities don't have the capacity to do on site checks. Some participants suggested that the responsibility for correcting this lack of enforcement needed to sit with an independent regulator. Others felt that building energy ratings could provide a good incentive structure that would allow individual consumers to become more aware about efficiency targets (although they cautioned that the certification would have to sit with an independent body of experts).

Anything we can do to promote social stability in Jordan is a good thing.⁵⁵

Given the high costs and huge demand for homes in Jordan, new housing and its effect on future energy and water demand is a major issue. One project that tries to tackle this from a development and humanitarian perspective is the UN Habitat Jordan Affordable Housing Programme in the

⁵² Norwegian Refugee Council (2015), *In Search of a Home: Access to Adequate Housing in Jordan*, 1 June 2015, <https://www.nrc.no/globalassets/pdf/reports/in-search-of-a-home.pdf> (accessed 13 Apr. 2016).

⁵³ This represents less than 10 per cent of future construction for Jordan, according to Abu-Dayyeh, A. (updated October 2015), 'From Energy Mess to Energy Management: Jordan as a Case Study (2007–2020)', Friedrich Ebert Stiftung Policy Paper. Amman: FES.

⁵⁴ Anecdotal evidence, Lahn, G. (2015). and Workshop participant (Amman, 19–20 May 2016).

⁵⁵ Workshop participant (Amman, 19–20 May).

northern governorates, which works with the local municipal authorities to find ways to ease social tensions and find affordable solutions to address the housing stock crisis. As part of its activities, the programme launched a competition to design an affordable (financeable) unit acceptable to both Jordanian and Syrian tenants, which could be owned by Jordanians and rented to Syrians. Much thought was given to the location of new housing, making sure land was affordable and were well linked to services and facilities such as schools and workplaces to reduce transport costs. This involved working with authorities and building capacity in the siting of new builds and linking to the banks that would offer financing to home-buyers. Efficiency was also part of the consideration although long-term operation costs had to be weighed against affordability of the property. In addition, the Jordan Green Buildings Council (JGBC) has a ‘Green Affordable Housing’ initiative with water, energy, sustainable siting including air quality, embodied water and transportation as the key components.

For existing buildings, participants recognized that the challenge was more difficult. Indeed, some suggested that the material for retrofitting existing buildings is either not available or too expensive (especially bearing in mind the subsidy described in box 2). However, a number of organizations have undertaken demonstration initiatives that are retrofitting houses across Jordan and proving both the cost savings and resource benefits of improving energy efficiency. It was broadly agreed amongst participants that more funds should be directed at finding out how low-income households, and old existing buildings, could be effectively insulated at reasonable cost, potentially using local materials. Especially given that so much gas is required for heating in winter and that the Jordan government subsidizes LPG.

With regard to refugee accommodation, the NRC has pioneered work in securing tenancy for vulnerable families in Irbid. This began as work with landlords, offering to finance the construction of an additional floor of their building in return for securing tenancy for a Syrian family over 12–18 months. As this agreement came to an end and families still required assistance with rent and living costs, the NRC offered to fit solar water heaters in return for reduced rents. This scheme is part of the EU-funded project including solar for schools (mentioned above). The NRC is in the process of installing SWHs on 100 homes in coordination with the MEMR, which supports demonstrating the benefits of SWHs and how such models can be replicated. At the time of the workshop, SWHs had led to the negotiation of around 30 per cent reductions in rent for refugee families and 40–50 per cent reductions in their electricity bills.

In the camps, ‘people are willing to pay but they say “give me something to do so I can pay.”’⁵⁶ Throughout the discussions, Jordanian participants highlighted the strong perception that the use of electricity and water inside the camps was draining scarce resources in the rest of the country. Humanitarian agencies face difficult choices as the Syrian crisis continues and they confront the spiralling costs of temporary solutions. Providing electricity to households is not one of the traditional needs met by UNHCR, which is normally more focused on shelter, water and education. In the past, energy planning for refugees living in camps considered only cooking, solar lights and street lights for security while diesel generators provided community services and NGO needs. The

⁵⁶ Workshop participant (Amman, 19–20 May).

importance of energy and water systems for both health and security in the Jordanian camps is making them a test site for a different approach.

The energy situation in both UNHCR-run camps is unique. Zaatari's electrical network was developed from a basic grid designed for street lighting and is connected to the national grid. Following problems with safety, overloading and high bills,⁵⁷ informal connections to households and businesses were cut in 2015, with ongoing adaptation to increase refugee access (see below).⁵⁸ Azraq, by contrast, currently has limited connections to the national grid. Electricity is provided to the base camp and diesel generation is used to power facilities and NGO offices.⁵⁹ Energy demand per capita is higher at Zaatari, which is a more organic, mature camp with active businesses, access to local markets and appliances and higher income levels. On the other hand, Azraq constitutes a more controlled environment with little economic activity and lower income levels, despite the existence of demand management plans for the camp.

UNHCR and NGO implementers have learned from the experiences in both Azraq and Zaatari in previous years – and new approaches are being deployed to reduce the burden on the national electricity grid, and on scarce water resources.

In particular, the solar farms – one being constructed at Azraq,⁶⁰ and one out for tender at Zaatari,⁶¹ will provide electricity for refugees, provide a lasting legacy for local populations, and reduce pressure on the electricity grid. Indications are that payback on the initial investment in Azraq will take around two years.⁶² Water, previously transported by truck, was now being provided by boreholes drilled close to the camps.

Despite these improvements, a number of challenges remain. First there is the question of sustainability of financing for energy. Camp administrators would like to move towards a system whereby refugees could pay for (at least some) energy services in order to ration use. Strong interest in smart metering systems for individual households and businesses that would allow billing was expressed at the workshop. However, the transience of residence experienced in the camps (Zaatari has a population of 80,000 but a turnover of around 450,000 per year), was raised as a challenge to household billing, with some also feeling that many households would struggle to pay.⁶³ It was thought that the Jordanian authorities may reject smart metering systems on the basis that they make the population appear more permanent.

In the meantime, at Zaatari, UNHCR is extending power by block on an experimental basis and limiting use to certain times of day. It is also considering introducing metering to extend

⁵⁷ The electricity bill for October 2014 reached a peak of USD 900,000.

⁵⁸ The Zaatari energy strategy has been designed to improve the network, reduce losses, increase safety, provide a reliable supply of electricity, improve demand management and to eventually develop a solar plant to offset electricity costs through a 'wheeling arrangement'. Meters and technical devices have been installed as part of this strategy, so electricity consumption is currently limited to USD 400,000 per month and is provided between 7–11 hours per day. Source: private communication with UNHCR.

⁵⁹ Solar street lighting was also funded in Village 3 by the IKEA Foundation.

⁶⁰ A private Jordanian company – Mustaqbal – was selected to construct the plant in 2015. It is the result of an innovative partnership between the UNHCR and the IKEA Foundation, whereby IKEA has provided the capital for construction of the asset. The UNHCR expect the first 2 MW of capacity to be completed in October 2016 – additional capacity to be added depending on demand. Workshop participant (Amman, 19–20 May).

⁶¹ German government funded (KfW). The solar plant in Zaatari is planned for construction in 2017.

⁶² Workshop participant (Amman, 19–20 May).

⁶³ Although this seems to run somewhat counter to what earlier studies at Azraq camp have concluded. See UNHCR (2015 unpublished) 'Baseline assessments and renewable energy feasibility studies in Ethiopia, Jordan and Bangladesh. Output 3: Baseline Survey Jordan, Azraq'.

connections to households. Household quotas of around 1 or 2 kWh per person per day were mentioned. Metering is a complex issue. Questions include whether refugees are legally allowed to be connected to a meter and at what rate they should be charged, if at all (see box 3).

Box 3: Challenges in charging refugees for energy

Collecting money for energy use requires a special licence in Jordan and these are held by the local electrical companies. The UNHCR would therefore need to partner with these companies. At present, IDECO and EDCO are not willing to engage in the metering of individual humanitarian operations (such as NGOs) or metering the refugee businesses or shelters. Prepaid metering, which worked with the existing charge card or voucher systems, could be a more acceptable solution if there were a third party legally able to manage the system and all required approvals and licences could be secured.^a

a) Private communication with the UNHCR.

Another issue is the selection of companies for energy contracting or appliances. There is little knowledge of the local private sector capacities in the humanitarian sector and lack of understanding of humanitarian sector processes in the private sector. There were questions over the extent of manufacturing that could be done locally, this was flagged by one NGO working on lighting and charging facilities inside one of the camps. An initial project had failed due to lack of availability of spare parts; while a follow up project with a company using local sourcing had proven successful. On the other hand, those using imported materials could bring down costs and others thought the emphasis on after-care service agreements was more important.

Perhaps more fundamentally, one participant also raised the question: ‘if the money that was invested in Zaatari and Azraq was invested in the cities and the towns instead – what would have been the result?’⁶⁴ There was strong interest in being able to evaluate the most cost-effective way for humanitarian agencies to support refugee families – i.e. through applications to directly benefit them and keep them in the camps or investments that help the hosting country manage the additional pressures on society at large.

Water management

All participants agreed upon the importance of prioritizing future investment allocation for water projects and making sure that the link between water and energy management was clearly understood. At the structural level, the need to rehabilitate basic infrastructure was deemed urgent. One participant said that simply replacing old water distribution infrastructure would save 20 per cent by reducing losses in the system. Similarly, Mercy Corps estimates that losses due to leaks and illegal siphoning off amount to around 50 per cent of total supply. It also estimates that the amount of water lost nationwide could provide for around 2.6 million people.⁶⁵

⁶⁴ Workshop participant (Amman, 19–20 May).

⁶⁵ A reported 400 wells were unlicensed out of an overall total of 1,318 in 2014. See Mercy Corps (2014), p. 30.

As with energy, participants additionally considered water subsidies as problematic. The Ministry of Water and Irrigation's debt is in excess of USD 1.3 billion and servicing debt is the largest item on the budget,⁶⁶ which restricts the ability of the ministry to undertake essential repairs as well as constructing new infrastructure. Reforming the subsidy regime was largely seen to be one way of promoting greater efficiency among the populace, and of reducing the ministry's crippling debt. Yet, there was disagreement about whether the best solution to this was to remove the subsidy completely and compensate (e.g. through cash transfers) the most vulnerable groups or reform it but maintain some subsidy given that in the current system 'consumers would effectively be paying for the government's mistakes', e.g. for poorly maintained infrastructure and losses.

As with energy, participants drew attention to the additional need of promoting efficient use of water and waste water treatment. Dealing with waste is a major issue for large camps and clearing it also involves energy and water for transportation and treatment. At the same time, waste contains water and there are possibilities for its reuse. There are currently three waste-to-energy projects in the camps. World Vision, for example, is running one that has a composting element in Zaatari. Interest was expressed in a study on what effect a biogas plant would have on water quality and whether this could be done safely and effectively in Zaatari.

Renewable-energy grid connection issues

The lack of clarity in permissions and classification regarding tariff and metering, amongst the different utilities and distribution companies, was frequently highlighted as an obstacle for renewable energy projects. For example, construction and generation of power from the Azraq solar farm had at the time of the workshop been delayed for several months due to approvals from the distribution authority.⁶⁷ In the case of places of worship, the distribution authority has a rule whereby there must be no outstanding bills for solar facilities on buildings to be connected to the grid. Many places of worship have large outstanding amounts amassed over years (some being charged JOD 1,000 a month) but the lack of connection is damaging the ability of the consumers to benefit from the solar PV and increase capacity to pay the bills.

Creating jobs, enhancing skills

There is an increasing emphasis on 'livelihoods' in funding sought by humanitarian agencies. Humanitarian funded projects are therefore increasingly looking for opportunities to employ both Jordanians and Syrians and provide useful training. This, in turn, would assist with the transition to self-reliance for refugees. The Azraq farm and the GIZ-funded waste-to-energy project at Zaatari are ongoing examples of this in the energy field. However, these schemes are very small and new. At present, few Syrians hold the right to work. Many continue working in the informal sector as permits are highly restricted and difficult to obtain.

⁶⁶ Mercy Corps (2014), p.28.

⁶⁷ The project was agreed as a net-metering project – this means that the cost of the amount of electricity generated by the farm and fed back into the grid will be deducted from Azraq camp's electricity bill; nevertheless, the distribution authority suggested it be classified as a wheeling project – for offsite generation meaning that the owner receives payment for the electricity supplied but with a 6 per cent charge for losses.

5. Job Creation and Economic Growth

Essential in the acknowledgment of a protracted refugee situation is dealing with the issue of legal permissions and rights for refugees, including permission to work. This is a sensitive issue, particularly where there is already high unemployment amongst young Jordanians. There was disagreement amongst workshop participants regarding the extent to which Syrians should be incorporated into the workforce (including how many refugees Jordan should accept for the long-term and how a fairer division of refugee intake could be sought among Arab League states). However, it was largely recognized that the current situation was unsustainable and detrimental to the Jordanian economy.

Since late 2015, the government of Jordan has taken steps to address employment rights. In December 2015, Jordan's Minister of Planning and International Cooperation, Imad Fakhoury, spoke of a holistic approach that 'gets [Jordan] out of this crisis to reach a win-win situation that would help the kingdom economically, create job opportunities and, at the same time, alleviate the refugee burden on the international community.'⁶⁸

While providing energy security to refugees is a humanitarian imperative, building energy resilience by investing in durable and efficient infrastructure can subsequently be an effective way of creating jobs and livelihood opportunities for refugees and nationals. For example, establishing a 2 MW solar power plant takes eight weeks from the time permits have been obtained, and employs 3 highly skilled people onsite (in the case of Azraq, these will be Jordanians) and potentially 20 Syrians (12 people for the duration of construction and others as needed).⁶⁹ This has several benefits: Jordan expands its usage of clean energy and increases its own energy production, becoming less dependent on energy imports; employment opportunities for Syrians open up, which makes a dignified life possible; social cohesion between Syrians and Jordanians is improved as they work side by side. Scaling up the solar energy sector by this model could hence have significantly positive effects on Jordan nation-wide.

Four years ago there was no green sector... now we have 'green collar' jobs. There is a lot on net metering and wheeling that can engage local communities and provide jobs.⁷⁰

Potential job creation in relation to meeting Jordan's objectives of reducing dependence on energy imports have been assessed by several studies. For example, the business association EDAMA estimates that equipping 50 per cent of government and commercial buildings with energy management solutions would create around 2,240 job opportunities over five years and decreasing energy use; retrofitting 5 per cent of existing building space would create approximately 4,080 job opportunities. On an aggregated level, one study has found that the clean tech private sector (renewable energy, energy efficiency, water and solid waste management) has the potential to create nearly 19,000 new jobs over the next five years, generating USD 366 million in government

⁶⁸ Imad Fakhouri, cited in Malkawi, K. (2015), 'Integration of Syrian refugees in workforce hinges on new investments', *The Jordan Times*, 21 December 2015, <http://www.jordantimes.com/news/local/integration-syrian-refugees-workforce-hinges-new-investments%E2%80%99> (accessed 7 May 2016).

⁶⁹ Workshop participant (Amman, 19–20 May).

⁷⁰ Workshop participant (Amman, 19–20 May).

savings. This is estimated to require around USD 2.9 billion in FDI⁷¹ and would, on its own, account for almost 10 per cent of the total number of jobs expected through the Jordan Compact. In turn, this would generate much needed value-added economic activity and constitute an avenue towards economic growth in Jordan.

Apart from the need to speed up the time it takes to obtain the necessary work permits, the Jordanian government needs to revisit the regulatory framework for its labour market, with a particular focus on labour quotas. Since April 2016, Jordan has granted work permits for Syrians and exempted them from fees for a three-month period. However, Syrians are only allowed permits for certain labour sectors. The electricity, gas and water sector, for instance, is at present closed to foreign labour.

The Jordanian economy is heavily geared towards the service sector, which accounts for around 70 per cent of GDP and 75 per cent of jobs, but creates very limited value-added economic activity.⁷² Essentially, the country continues to rely on rents, remittances and foreign aid. The aid pledges from the London donor conference in February 2016 and FDI present opportunities for Jordan to reduce this reliance. Injections into infrastructure projects and strategic sectors that could include water and energy efficient construction and engineering and energy efficiency and renewable energy could create job opportunities for both Syrians and Jordanians, enabling them to pay for energy, rent and other currently subsidized services. Nevertheless actual jobs in energy efficiency and renewable energy have limitations; participants agreed that the real benefit would come from these interventions making energy cheaper for businesses over the long-term.

Ways to evaluate the comparative effectiveness of directing crisis funds towards supporting individual households or making these kinds of national level investments were of great interest to potential donors.

⁷¹ Private communication with USAID Jordan Competitiveness Program based on a study on the clean technology sector conducted in 2014.

⁷² UNDP (2015), 'Jordan Poverty Reduction Strategy', p. 31, http://planipolis.iiep.unesco.org/upload/Jordan/Jordan_PRSP_2013.pdf (accessed 8 Jun. 2016).

6. Conclusions

We [humanitarian agencies] need to look at where we can reinforce the progress, policies and strategies in Jordan and to see how we can do it better.⁷³

Most participants at the workshop agreed that Jordan possessed some significant advantages in regard to the development of sustainable energy solutions. There was a general consensus that Jordan is a leader in the Arab world in terms of solar PV, its institutional and regulatory framework, and the presence of an active national private sector.⁷⁴ The government of Jordan has acknowledged the long-term nature of the crisis and has taken significant steps to support genuine long-term resilience as well as short-term relief in the JRP. Significantly, a great deal of information has already been gathered on living conditions and energy use and the camp situations are regularly monitored by the cluster groups. Stakeholders have been clear that ‘we don’t need more data or surveys, we need practical implementation that will reduce stress on national resources.’⁷⁵

General lessons

While the context regarding energy investment and refugees in Jordan is unique – some lessons can be drawn for other middle-income countries coping with a large influx of largely urban refugees. In particular, the lessons below may be relevant to those countries such as Turkey and Lebanon, which are in the same region and whose refugees face similar experiences both in the host country conditions that they enter, and in the challenges and tensions that their presence may generate or enhance.

The exit strategy is important. We need to make sure the infrastructure left behind supplements and complements the existing grid and mitigates the impact [of additional population pressures] – the emphasis needs to be on contributing rather than taking away.⁷⁶

Understanding points of energy interaction between refugees and the host community

Although there is limited research on effective assistance for urban refugee populations, as a first priority, all arrivals will need to find and retain accommodation. Not only does this prefigure a set of energy and water needs and demands, but finding housing also establishes new dynamics between refugees and the host community – most often in the form of entering the rental market, and in establishing a tenant-landlord relationship between refugee and host.⁷⁷ They will need to secure/pay for a supply of water and electricity and in the case of west Asian countries, likely need to buy gas in canisters for cooking and winter heating. With low, dwindling and insecure incomes,

⁷³ Workshop participant (Amman, 19–20 May).

⁷⁴ Workshop participant (Amman, 19–20 May).

⁷⁵ Lahn, G. (2015 unpublished), ‘Jordan MEI Background Briefing’, Briefing, London: Royal Institute of International Affairs.

⁷⁶ Workshop participant (Amman, 19–20 May).

⁷⁷ Church World Service (2013), ‘Accessing Services in the City, The Significance Of Urban Refugee-Host Relations In Cameroon, Indonesia And Pakistan’, February 2013, http://cwsglobal.org/wp-content/uploads/2015/12/urbanrefugee-fullreport_final4-8.pdf (accessed 9 Jun. 2016).

this means the risk of energy poverty and environmentally damaging coping mechanisms (such as the increased use of wood and biomass in Lebanon, for example). Homelessness obviously presents greater risks to lives and health.

In countries where LPG or fuel oil and the low levels of electricity and water consumption are subsidized, these purchases also entail a rise in the subsidy bill for governments. This means there is a shared interest in reforming the subsidy and increasing low-income household and refugee ability to pay and/or investments to help reduce consumption (and therefore reduce subsidy) such as those to install insulation, solar water heaters, and potentially heat pump technology. Refugees will also be using community facilities including schools, hospitals and places of worship. Where these are paid for by the public purse, there is a case for helping to reduce bills through, for example, retrofitting and solar energy applications. These kinds of interventions should consider sustainability and transformative elements that link up with the wider energy objectives of the country. Depending on the type of intervention, a number of the following considerations will apply:

- Opportunities for growing the local market – tendering for local companies; ideally that can supply aftercare service where appropriate;
- Encouraging greater social cohesion between host and refugee communities;
- Engagement of stakeholders/communities in the process/consultation/managing technology/awareness raising of benefit sharing where appropriate to enable ownership (e.g. in the case of shared facilities, such as solar lighting or community regarding applications);
- The sustainability of financing for scaling up, e.g. through revolving funds composed of savings through electricity bills for larger buildings; through models that enable consumer payment – particularly necessary where the lower consumption brackets are highly subsidized; and/or plans for intervention to help attract private capital for scale up in future (e.g. by proving commercial viability);
- Opportunities for quality job creation and enhancing local and refugee skills;
- Working in tandem with ongoing long-term development initiatives, e.g. to build government capacity in the relevant area, enforce building codes, develop the efficiency services industry; and
- Changing the culture of consumers to show the benefits of energy efficiency and renewable energy.

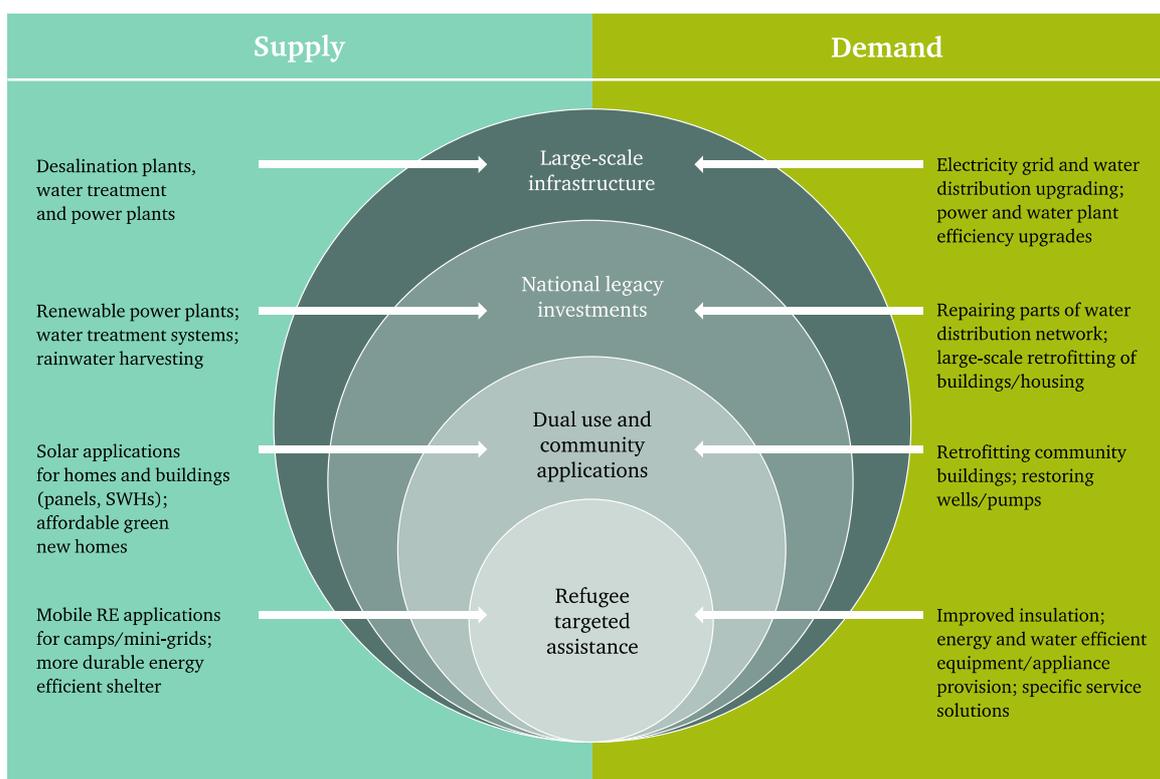
High-level coordination to enable transition from relief to resilience in protracted situations

First and foremost, good levels of coordination at the national level are required to ensure that aid and financing are complementary to the overall energy (and water) sector objectives. In this sense, the JRP is exemplary in mapping out how much and where support is needed over a given period and having a single point of contact (MOPIC) for those who wish to contribute. This makes it easier

for would-be donors and implementers to see exactly where they could channel funds in an effective manner.

Figure 1 illustrates the kinds of energy investment with which a combination of grant funding and finance from a variety of sources (development aid, private sector, development banks, climate finance, humanitarian aid) could assist with in countries affected by the Syrian crisis. To help simplify the levels of assistance possible, it roughly divides these into ‘large-scale infrastructure’, ‘national legacy investments’, ‘dual use and community applications’ and ‘refugee targeted assistance’ although these categories naturally overlap. It does not attempt to say which is the most cost effective as that will differ on a country-to-country basis, but the idea is that there are a number of possibilities for different budgets, foci and levels of funding that could be targeted at energy and water in a coordinated way, towards greater resilience and system transformation.

Figure 1: Energy investments – from relief to long-term resilience



Source: Chatham House, based on responses at the workshop on Energy Resilience and Refugees, Amman 19–20 April.

Scaling up what is already working

There is likely to be substantial learning on the above from existing local civil society, municipal and development partners working on the ground for many years. Where humanitarian agencies want to assist in urban situations, they are unlikely to be the most experienced or well-equipped to draw up and manage the kinds of contracts necessary and may look to join with development and/or government partners to reinforce existing projects. There will also be successful projects with initial

sunk costs, just waiting to be scaled up. This will be much more cost effective than pouring money into new and ‘innovative’ pilots. In this sense, the following would be useful:

- A mapping of ongoing projects, their implementers, financiers and status with a hub through which potential donors can be aware of which projects require further funding and what the outcomes of these projects are; and
- Understanding the blocks (legal, political, administrative, supply chain) to scale up and offering assistance to help with their removal (see the below section on ‘Joining Forces’ for examples).

Joining forces to improve the national context for energy investment effectiveness

For all these opportunities, there are likely to be higher level obstacles and blockages to transformative change, which would allow interventions and funding to be deployed much more effectively. It is suggested that development, humanitarian, civil society and private sector parties work together to address some of these challenges through making a consistent and constructive call for change. This collaboration should be prefigured on the basis of:

- An awareness of full costs of resource production and use and encouragement of a viable plan for gradual subsidy removal and transition to cost-reflective pricing in tandem with necessary supports and transfers to low-income groups;
- A reform of utilities/regulatory sector to make sure that incentives are aligned, e.g. in infrastructure maintenance, efficiency, encouraging efficiency services and meeting renewable energy targets;
- Overcoming bureaucracy to allow investments to be processed in a fair, standardized and efficient manner; and
- Upgrading of grid or distribution infrastructure to reduce losses and in the case of power, to enable greater uptake of renewable energy over time.

7. Recommendations and Suggestions for Achieving Targets Set in the Jordan Response Plan

On funding for energy resilience

- Aid pledge from donors at the London conference and FDI can help Jordan to increase productivity and opportunities for jobs, for both nationals and refugees, by helping to fund infrastructure projects and strategic sectors, including water, energy efficiency and renewable energy sectors and construction with consideration for energy and water sustainability.
- There is a need for both large and small project funding, so long as these projects align with development planning (the JRP).
- Energy interventions should, where possible, adopt an efficiency first focus. Lack of attention and investment in efficiency will increase the costs of meeting Jordan's renewable energy targets as power demand grows.

Government level

- Practical enforcement measures, incentives and nation-wide awareness raising to make sure contractors comply with building codes and SWH legislation;
- Upgrading the grid to enable more renewable energy uptake;
- Clear, sustainable policies on wheeling and tariffs to enable the scale up of renewable energy investments;
- Appointment of a champion in government or the Royal Court to help cut through bureaucracy for key strategic projects (in line with the JRP); and
- Sustainability (including in camp situations) requires finding ways for users to pay for the energy or efficiency services from which they benefit. For refugees, this means finding ways of allowing them to work legally.

Humanitarian actors

- Humanitarian development, civil society and private sector partners should focus attention on low hanging fruit: insulation, LEDs, SWHs – public buildings could be a priority – in a way that engages and helps build the local market and reinforces ongoing efforts on enforcing building codes and using accredited ESPs.

- The humanitarian sector should be open to private sector engagement in camp markets but policy must be clear – companies will not want to enter a market where they risk an influx of competing donated products provided for free in future.
- The humanitarian agencies can find ways to reduce their own energy footprint, especially where transportation (increasing congestion and pollution) is concerned – e.g. by encouraging mass transportation arrangements and accommodation closer to workplaces.
- In the absence of subsidy reform, design of practical financing models that would work for lower income groups in Jordan (those using under 600kWh/month) must be continued and expanded.

Energy resilience project funders, commissioners and the MEI

- Projects that reduce bills for public infrastructure and also increase social cohesion such as those retrofitting and solarizing buildings used by both Jordanians and Syrians are welcome; there are already successes that could be scaled up.
- A pilot in one neighbourhood could demonstrate how to retrofit low-income housing using affordable (potentially local) materials and provide showcases of how much this would save.
- Finding ways of engaging and building on Jordanian and Syrian skill sets in commissioning and implementing projects will help reduce costs over the long term and can be in line with a wider national ambition to grow Jordan's capacity as a hub for energy-related expertise in the region.
- Building on the mapping of energy-related projects to provide a bank with updates on status and experiences online to help avoid duplication, encourage faster peer-to-peer learning and attract funding.

For all stakeholders

- Form a coalition of concerned parties across the government expert, UN, NGO, business, energy and humanitarian fields, which combines voices and assembles evidence to inform policy change to enable greater effectiveness of investment (see the section on 'Joining forces to improve the national context for energy investment effectiveness' above).

Next steps for the MEI

Based on the above findings and recommendations from stakeholders in the energy and humanitarian sectors in Jordan, the Moving Energy Initiative will design a programme of work there for 2016–17.

Appendix: Amman Workshop Participants

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Andrew Harper, UNHCR's Representative to the Hashemite Kingdom of Jordan
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Batir Wardam, Jordanian environmentalist, GIZ
Ben Good, CEO, GVEP
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Julie McKinlay, Program Manager, World Vision
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Cover image: A father and daughter from Homs, in Syria, walk in the street outside the building in which they live in Zarka, Jordan, on 8 September 2015.

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