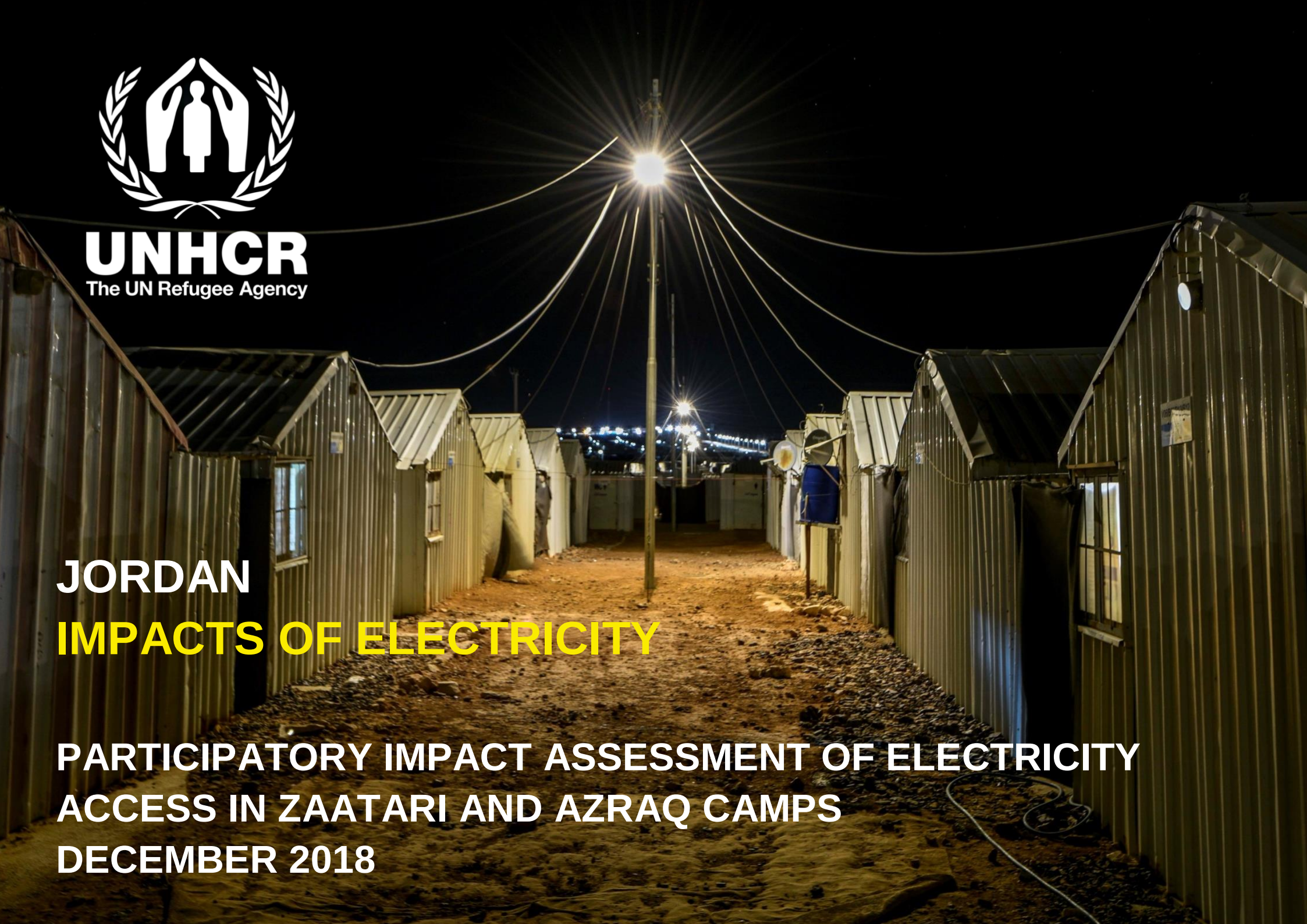

UNHCR
The UN Refugee Agency

JORDAN
IMPACTS OF ELECTRICITY

PARTICIPATORY IMPACT ASSESSMENT OF ELECTRICITY ACCESS IN ZAATARI AND AZRAQ CAMPS

DECEMBER 2018

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FRONT COVER PHOTOGRAPH: ©UNHCR-JORDAN: M.HAWARI
INSIDE BACK COVER PHOTOGRAPH: © UNHCR-IRD ZAATARI CAMP – ZAD AL KHEIR (Photo Activity Participant)

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INTRODUCTION

Energy for Sustainable Development is a major institutional priority and providing electricity to homes and businesses is one of the main goals for the UNHCR. The development of electrical infrastructure in Jordan's Syrian refugee camps has been guided by the Global Strategy for Safe Access to Fuel and Energy (2014-2018), which formulates the following vision for 2018:

> ***"All refugees are able to satisfy their energy needs for cooking and lighting in a safe and sustainable manner, without fear or risk to their health, well-being and personal security."***

With an increased interest from the donor community around innovative financing, renewable infrastructure and replication of similar initiatives to the solar plants in Azraq and Zaatari camps, the objective of this the Participatory Impact Assessment (PIA) on the provision of electrical energy is to provide statistical data and qualitative findings into the impacts that electricity has on the protection, health, education and economic inclusion & livelihood outcomes of refugee in Zaatari and Azraq camps. In addition to the presented impacts on the lives of refugee's, positive operational impacts regarding the environmental and financial benefits of renewable infrastructure are detailed.

The data presented is based on a series of qualitative and quantitative assessment techniques undertaken by the Technical Unit, partners and contracted organizations since the camps opened in 2014. These include surveys of the camp population and focus group discussions with men, women, boys, and girls; formal and informal interviews with camp residents, staff and electrical contractors and a review of existing literature on electricity and energy provisions in camps. Details about these sources, methodology and analysis can be found in the document *Electricity Participatory Impact Assessment Report: Analysis from PIA in Azraq and Zaatari Camps Quantifying the Overall Impacts Electricity has on the lives of refugees (2018)* available through UNHCR Jordan.

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JORDAN OPERATION

Since the early 1990s, UNHCR operations in the Hashemite Kingdom of Jordan have been relatively small, serving a few thousand refugees and asylum-seekers from several countries in the Middle East and North Africa region. After the crisis in Syria erupted in March 2011, however, tens of thousands – and later hundreds of thousands – of Syrian refugees were forced to flee across the border and seek international protection in Jordan.

Over 670,000 Syrian refugees are currently registered with UNHCR in Jordan (as of December 2018). Additionally, the Kingdom hosts refugees of Iraqi, Yemeni, Sudanese, Somali and other nationalities, for a total of over 760,000 individual, making Jordan one of the countries with the highest refugee population per capita, and placing enormous pressure on the country and its host communities.

UNHCR works closely with the Government of Jordan and numerous other national and international partners in providing protection and assistance to refugees and asylum seekers, as well as to Jordanian communities affected by the refugee influx.

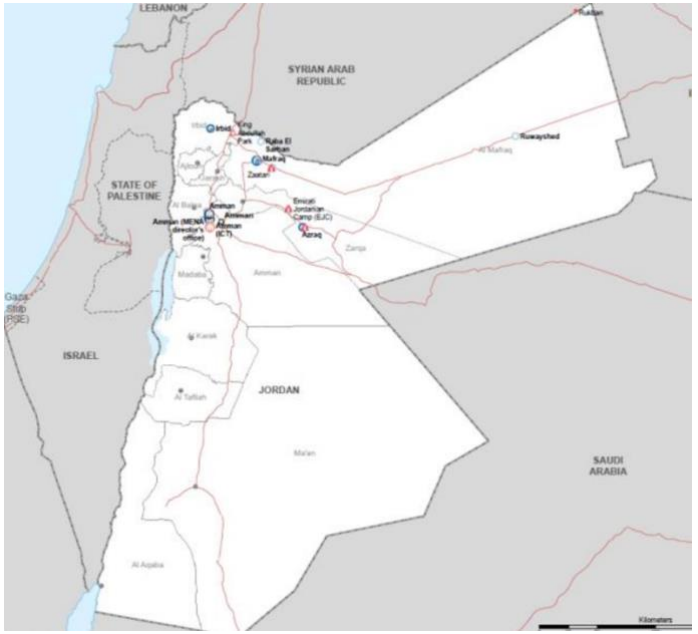
762,088
Refugee registered in Jordan with UNHCR in December 2018

671,650
Syrian Refugee registered in Jordan

83%
of refugees living in urban areas

17% of refugees living three camps: Azraq, Zaatari and The Emirati Jordan Camp

The electricity assessment will focus on the refugee population in both Azraq and Zaatari camps.

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ZAATARI CAMP ELECTRICITY ACCESS

Zaatari Refugee Camp was established in July 2012 to respond to the mass displacement of Syrians to the Mafraq Governorate. The camp covers an area of 5.4 km² and supports a current population of 78,527 refugees, nearly 20% under five years old. Approximately 16,000 shelters are in the camp with 20% occupied with female headed households (as of December 2018).

An electrical network was established in Zaatari in 2012, developed with the support of the Irbid District Electricity Company to ensure the expansion of essential energy needs of the camp including various service providers (base camp, NGO's, etc.) and street lighting in the camp. The electrical connections to shelters and businesses were originally created in haphazard fashion by the refugees themselves and presented serious health and security risks.

Due to safety concerns and an ever increasing electricity bill for UNHCR, in 2015 the whole network was disconnected and reconstructed, bringing a dedicated connection to each household.

The KfW 12.9MW Solar plant was completed in October 2017; the largest renewable infrastructure in a refugee camp in the world. Via an electrical network upgrade funded by the Government of Czech Republic it provides renewable energy to the entire camp population plus over 50 organizations and operational facilities access power through this local grid.

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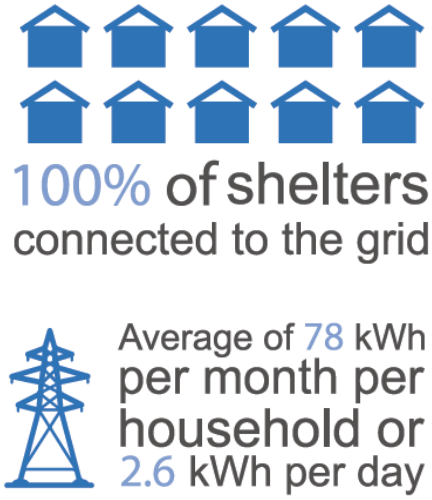

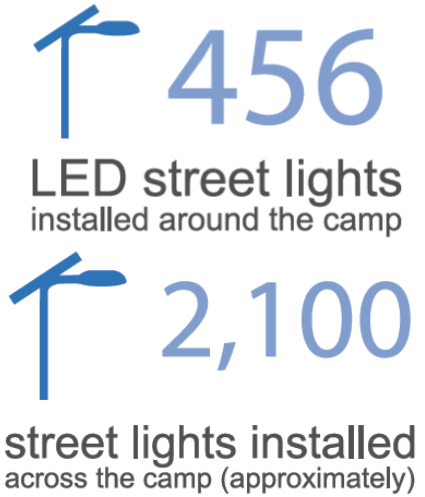


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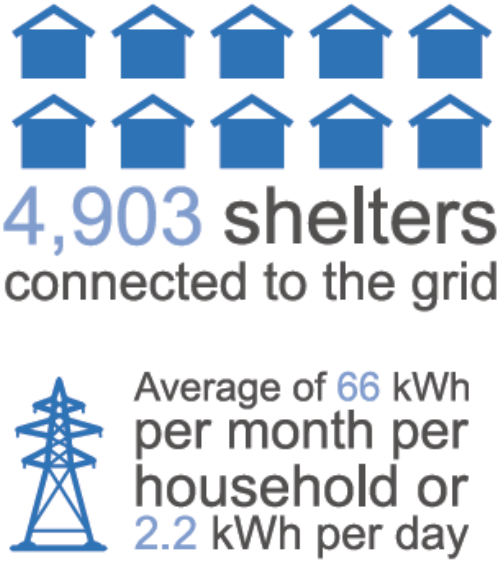
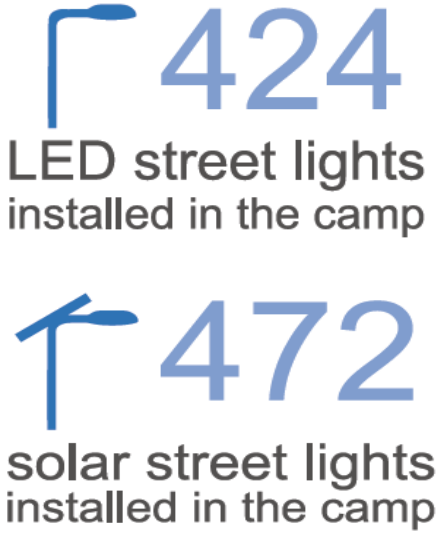
AZRAQ CAMP ELECTRICITY ACCESS

Azraq refugee camp construction began in May 2013 to respond to the overflow of Syrian unable to be located in Zaatari refugee camp. The camp itself stretches for some 14.7 km2, has a current population of approximately 34,000 and is roughly 20km from Azraq town in Zarqa Governorate.

Built after Zaatari camp, Azraq has learned lessons from the illegal electrical connections undertaken by refugees in Zaatari and beneficiaries desire for stable electrical connections. During the High Commissioner's visit to Azraq on 3 May 2014, it was decided to bring electricity to Azraq to create equality of service for the Syrian refugee population in both refugee camps in Jordan. Connecting to the local grid with power provider *EDCO*, Village 3 and 6 were connected to the grid in 2017, with Village 2 and 5 connected in December 2018. Base Camp, various facilities and markets are also currently connected to the electrical grid, paid for by UNHCR.

The third phase (1.5MW) of the IKEA Foundation solar plant will be completed in mid-2019. The first phase connected in May 2017 was the first of its kind in a refugee camp. This original 2MW, plus Phase 2 of 1.5MW (September 2018) and Phase 3 of 1.5MW is anticipated to cover 70% of the all shelters energy needs in the camp.





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ELECTRICAL APPLIANCE OWNERSHIP

Initial electricity access (2014) was via Solar Lanterns. In Azraq this the primary source of power for 61% of shelters (with on average 1.85 lanterns per shelter), followed by 34% with home solar systems (also distributed by UNHCR or partners). Feedback from beneficiaries indicated that generally the quality and quantity of lanterns was inadequate, with limited duration of light, low illumination, declining battery life (2.5 hours less on average from when they received them).

As of the end of 2018 all shelters have light through electrical connections to the local grid. Lanterns (16%) are still used when the grid connections are turned off, also solar home systems (31%) and car batteries (10%) are used to provide electricity in these times.

It is understood that when refugees arrived at Zaatari and Azraq camps they had very few electrical appliances or devices. They carried mainly clothes and cash with the intention of buying what was required when they arrived. Baseline survey from Azraq showed phones were the most common electrical device when people arrived with 91.4% of households having a phone, 57.2% of these being smart phones, and 53% of households owning 2 or more phones. Only 4 percent of the population had another sort of device: TV or radio or blender.

With electricity provided through the grid device ownerships has increased across both camps. Lighting devices, mobile phones, fridge's, fans, washing machines and televisions are common place in most shelters.

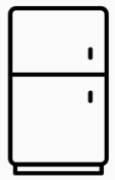
100%
Lighting device ownership across both camps

92%
Television ownership across both camps

98%
Mobile phone ownership across both camps

72%
Fan ownership in Zaatari camps*

55%
Washing Machine ownership across both camps



35%
Fridge ownership in Zaatari camp*

Based on a 2015 USAID Survey on Appliance ownership (Zaatari) and a 2017 EDAMA Survey on Appliance Ownership (Azraq)
* Data not available for Azraq camp

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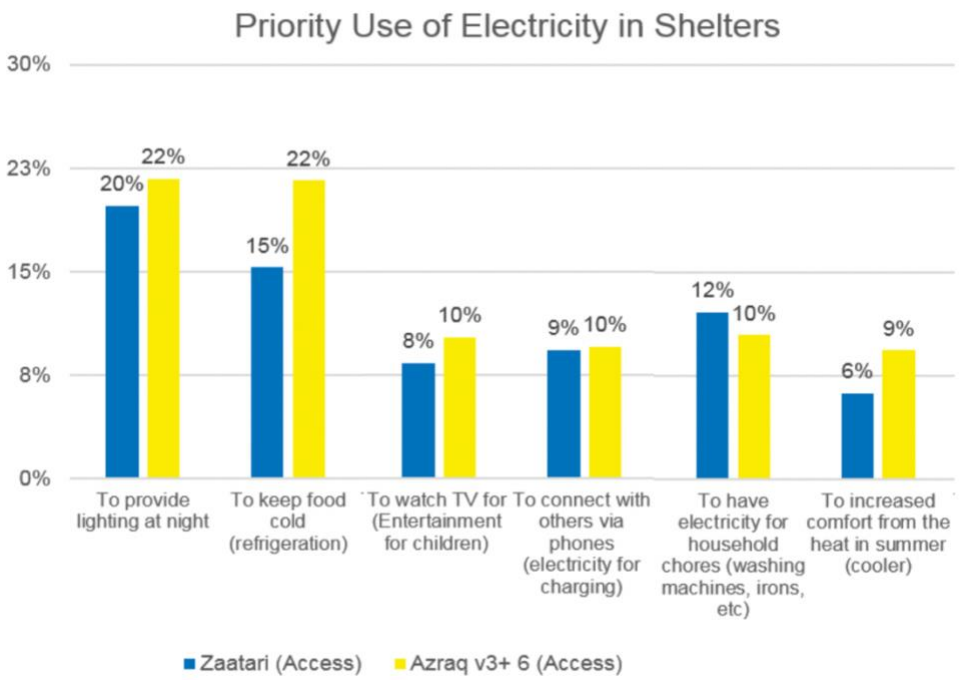
ELECTRICITY IMPACT ASSESSMENT

Electricity in camps is an *enabler*: it enables households and services to operate an array of lighting and appliances in order to support aspect of daily live. Priority uses of electricity focus on lighting, refrigeration and household chores.



Trends have been identified from the qualitative and quantitative data collected as part of the impact assessment activities. Given the complicated nature of human societies, and particularly refugee camps, it must be clarified that the implied impacts cannot be attributed solely to the availability of electricity in camps. A range of other factors also informs these cross-cutting impacts. This does however give an initial baseline to support how UNHCR delivers services and how these services are access, supported or hindered by electricity provision.

In order to better understand the lived experience of Syrian refugees and their relationship to electricity, a participatory photography activity was undertaken in both camps with refugee youth.

Supported by IRD in Zaatari (as pictured opposite) and CARE in Azraq, these youth were tasked with photographing how electricity affects the way they, and their families live, interact, learn, eat, feel safe and work in the camp.

The photos and stories shared by these youth are on display in the solar plant control rooms in both camps and used to illustrate the below sections on electricity impact, supporting the wider assessment findings. *NOTE: at the time of this exercise photographers in Azraq Village 2 did not have access to electricity.*

©UNHCR-IRD ZAATARI CAMP

PROTECTION IMPACTS

As an enabling factor to support protection outcomes, electricity access in Jordan has been shown to improve the environmental safety for women and children inside and outside the home, supported to reduce tension between families and increased the overall connectivity of beneficiaries.

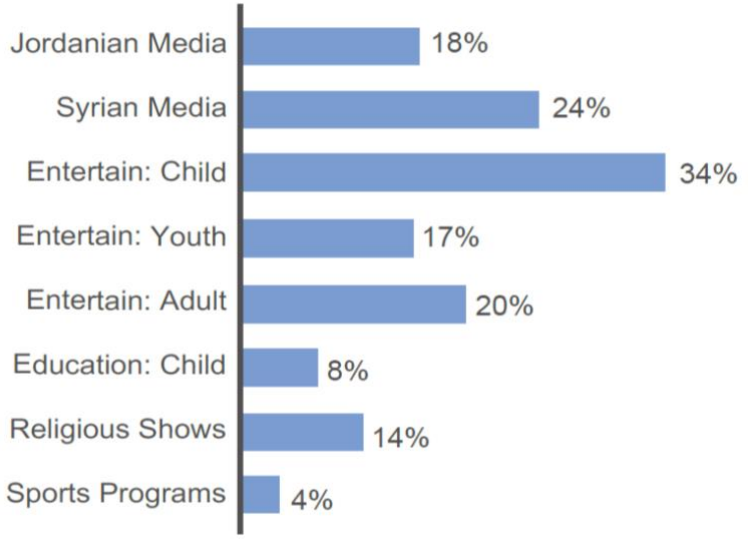
Gender Based Violence

UNHCR's Global Strategy for Safe Access to Fuel and Energy (SAFE) for 2014-2018 emphasizes the importance of the provision of lighting to prevent SGBV, which often occurs during dark hours. It was identified that lighting inside and outside the home, and the prevalence of TV's (as a form of entertainment) all contribute positively to dynamics between men and women (and children).

Safer Indoor and Outdoor environments

In support of the safer indoor and environments both boys and girls in FGD's (in 2017 and 2018) described safer living environments indoors and outdoors resulting in more time spent with friends and family inside and willingness to travel between districts in Azraq (over large distances) also in the evening. Improved and safer environment for children was reported by 88% of respondents when compared to times prior to connection.

Parents expressed concern for children playing outside, with one of the largest impacts on children safety being the provision of television. In both locations children's entertainment was seen as the main use of TV, this was supported in FGD's and photo-voice activities.



Priority Uses of Television

This access to television is reported to reduce the impact of boredom and apathy in young children proving them with safe environments to play and be entertained.
Similarly, children's anxiety was reported to be exacerbated when there was no light: children are anxious and become scared of the dark.

People are happy when the market looks beautiful. They go out to change their environment and children's scenery instead of staying in the house, in the dark, showing them there is more of life

Hussain (Male, 19), Mohammed (Male, 21) (Zaatari)

PROTECTION IMPACTS

Community Engagement

"Life is more colourful, it's like seeing for the first time after you've been blind"

Male (48 year old) FGD respondent on lighting in the camp.

Improved indoor environments results in more interaction between family members and between families within both camps. In FGD's all groups reported more likelihood to do activities with family and friends inside at night: cards, talk, hang out as the environment was conducive. This was supported by survey data with 92% of respondents claimed more social interactions, and then 90% stated electricity access, and the subsequent interactions gave them an increased sense of belonging and feeling part of a community, and finally 81% stated they are more likely to participate in community events and activities. Lighting in market areas, and shops that remain open into the evening (with access to electricity) impacts the 'sense of normality' in the camp. These places help reduce monotony which refugees currently experience, and when Syrian products are available, give them a 'flavor' of their homelands.

Connectivity to outside world

In addition to increased physical connection with friends and family, phones and TV's provide access to information and lives outside of the camp. Phone ownership in Jordan's Syrian camps is 98% with 80% respondents claiming to have better access to family outside the camp living in Jordan, Syria and other locations abroad. With improved charging on phones through the electrical grid respondents claim to speak longer and more regularly with family members. One of the largest changes in connectivity in both camps is also the role internet pays in providing alternative sources of communications; messaging, skype, Facebook, Whatsapp and so on. Internet connection also provides increased exposure to news and information, allows internet searches and improves entertainment options for families.

81% of families stated they have better access to news about Syria because of televisions, with news from Syria being the second main use of the television (19%) behind children's entertainment (28%), followed by adult's entertainment programs (14%) then news about Jordan and youth entertainment both being deemed important by 11%.

PROTECTION IMPACTS

Charging the phone, we don't have electricity, so we have to use the solar power system. If there's no sun, we can't charge our phones.

Heba (Female, V2, Azraq)

"Since electricity came back, especially in the main street, I've started to go out with my friends at night and play under the light in the street."

Husein (Male, V3, Azraq)

If there is no light, how are you supposed to sit and eat? People who have light sit and have fun, whereas those who don't just stay as they are, sitting in the dark, seeing nothing in front of them.

Taghred (Female, 13, Zaatari)

HEALTH IMPACTS

The health of refugees is a key component of protection and a priority for UNHCR. Access to health services, nutrition, water and sanitation are fundamental human rights, and the right to freedom from hunger and malnutrition is backed by international conventions.

Medication Storage and Independence

82% of respondents claimed that fridges improve their ability to store medication (namely insulin). UNHCR has historically distributed a thermos and ice to help store these medications, and in Azraq encouraged the use of in-ground clay storage capsules. The extended storage of medications can result in increased independence of elderly and disabled beneficiaries who are less reliant on others to travel to clinics, along with less distribution challenges for organizations with improved storage of medication at their facilitates.

Increased Environmental Comfort

The use of fans inside shelters contributes to improved environmental comfort. In summer months in Azraq and Zaatari beneficiaries often use spray bottles with water mist to keep cool, or cold towels around the neck or head when outside. The use of fans was also reported to improve night time household temperatures, resulting in better sleep, and *"even if the fan blows hot air, it still keeps mosquito's away"* (Male FGD member).

Birth-rates and Post Natal Care

Light and more comfortable environments in shelters (fans and lights) can support the post-natal care of new-born children. 91% of respondents believed that breastfeeding and hygiene of newborns has improved since the connection of stable grid electricity.

FGD's in both 2017 and 2018 (in both male and female sessions) also suggested that rates of pregnancies were connected with the provision of electricity: lights and television inside shelters reduced boredom and provides activities in the evenings.

Accidents and Injuries

Physical health of beneficiaries is impacted by the safety of the environment around them. In Azraq and Zaatari many males ride bicycles as their primary means of transport. 89% of respondents in both camps indicated, with increased external light there is a less likelihood of bicycle accidents or injury for hazards outside. Positive trends were also identified for less risks with regards to rodents, dogs and insects (as you can see them) both inside and outside the house.

It's very important that medicines are preserved safely as you can only get them for chronic illnesses once per month, and we have to keep it the whole time in a cool place – like the fridge.

Qaseem (Male, 20, Zaatari)

HEALTH IMPACTS

Nutrition - Diversity of Diets

Diets of beneficiaries have improved through the availability of fridges running off the electrical network. This includes both the type and range of foods available at shops (93% claiming a wider range of food since electricity was supplied to markets), and also a household's ability to store food at home: whether buying in bulk or leftover food. Prior to electricity Azraq residents claimed they would visit the shops every day to buy food; with a fridge, this now only occurs on average once or twice a week. Households consume more vegetables, meat, and yoghurts and dairy products, and by buying in bulk reduce their overall expenditure on food.

Food Poisoning

In addition to a refrigerator enabling improved nutrition outcomes for beneficiaries, it also allows households to store leftover food for longer. UNHCR Health team raise awareness around food poising from rotten food: the introduction of fridges at the household level can support with improved storage.

Cleaner Home Environment + Less Food Waste

Women and men in FGD's indicated improved hygiene conditions in the house. With food now stored in fridges, and 95% of households indicating they now produced less foods waste it was reported there are less rodents and bugs inside the shelter, and this reduction in food waste attracts less dogs outside of the shelter.

Hygiene - Cleaner Clothes

Hygiene impacts were also reported through the use of washing machines to wash clothes. Respondents claimed clothes are cleaner when machine washed, and also in winter dry quicker (when straight out of the washing machine) minimizing the risk of colds. Cleaner clothes were also reported to improve the confidence and self-esteem of the boy and girl FGD participants.

Here mouldy or rotten food, which is no longer safe to eat. This is such an important reason for electricity in the camp: to be able to preserve food and ensure the safety of the food in general.

Saber (Male, 21, Zaatari)

HEALTH IMPACTS

Here, one of the children in Village Two fell in a hole in the street. It's dark at night, so he fell without even noticing the hole.

Madj (Female, 18, V2, Azraq)

We don't have electricity, so we don't have fridges, so there is a lot of waste of leftover food. This often attracts dogs in the street.

Madj (Female, 18, V2, Azraq)

Washing is hard work for women. Constant washing and no electricity will affect her hands due to contact with the chemicals and also the hand and arm muscles due to the constant work.

Madj (Female, 18, V2, Azraq)

EDUCATION IMPACTS

Increased lighting for education is often referenced in literature on electricity provision in humanitarian and development contexts.

Light and Safe Spaces for Study

In the Azraq and Zaatari camps Solar Lanterns were the baseline source of electricity, with approximately 1.5 hours of time available for children and youth to study; shared between different children.

In previous assessment 32% said children indicated they would study at home after dark; with the electricity connection this has increased by 15%, with 47% doing homework inside at night. This not only provides longer hours of light but is also reported to be a better quality light, resulting less stress on eyes. 89% of respondents deem lighting for homework to be very important or important.

In both Azraq and Zaatari school days are broken into gendered half: girls in the morning, boys in the afternoon. In the baseline phase 60% of students indicated they would study inside in the day time, with this figure currently dropping to 49%. Students are stitching to night-time study as shelters in the day time are uncomfortable (too hot) to study effectively.

Devices for Homework and Learning

Of all devices present in the household phones make up 99% of the share in Azraq with less than 1% with access to a computer/ laptop or tablet. In Zaatari this figure of laptop and tablet is slightly higher with 7% laptop and 3% tablet ownership. In total almost a third (32%) of respondents said these devices are used for educating or learning.

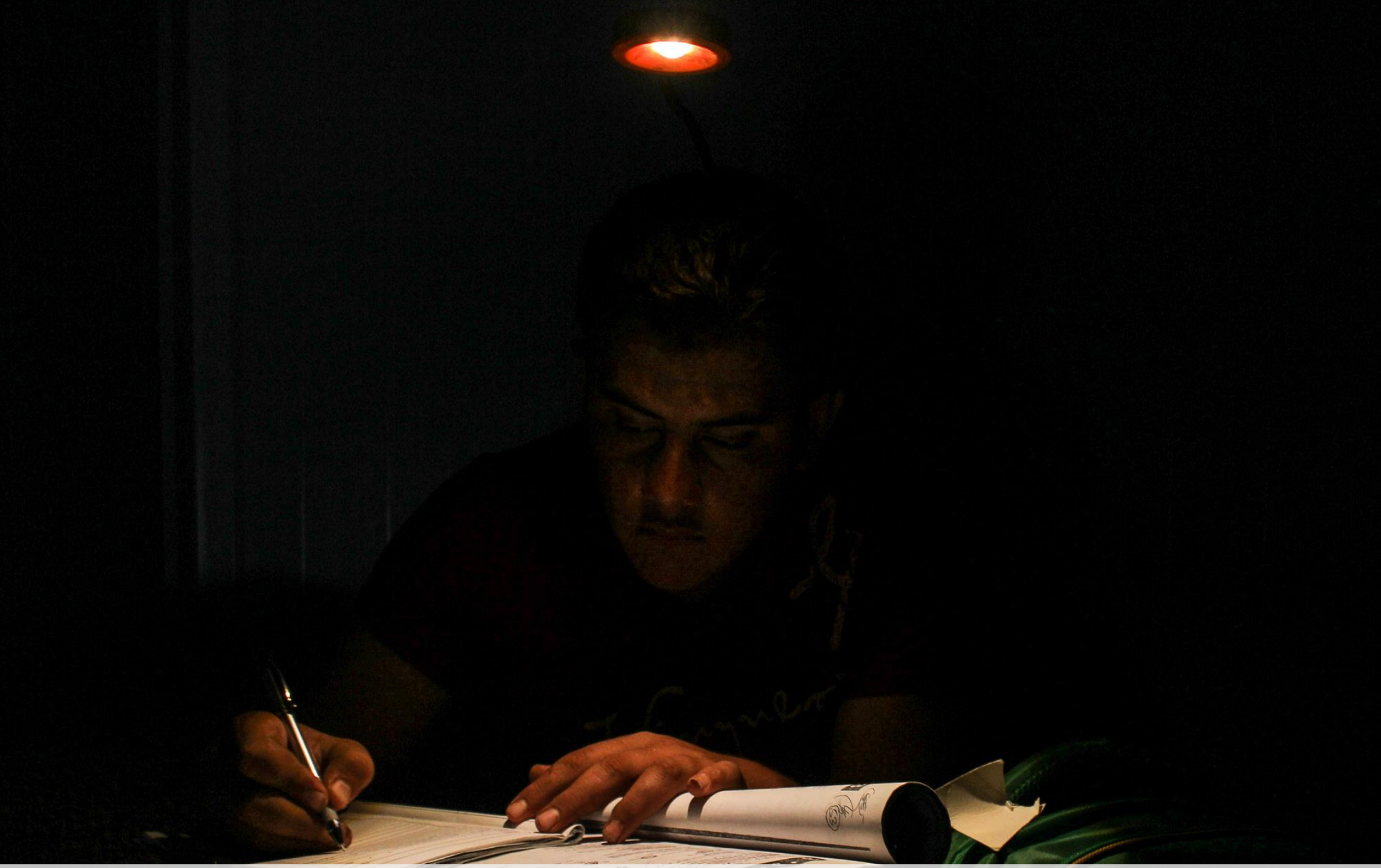
The primary education and learning use of these devices was to complete homework (65%). The improved charging of phones means this can occur for longer and the recent internet connection ensures that there is better access to information and knowledge through smartphones.

Online Study and Educational Courses

Based on survey findings, 6% of those who used devices for learning would complete university courses online (through phone, tablet or laptops). The majority of secondary and tertiary course opportunities for refugees are currently delivered through UNHCR partner community centers. Access to electricity for devices will mean in the future collaborations with international tertiary institutions can provide greater study and educational opportunities for youth in Azraq and Zaatari camps.

This child and his sister are studying by the light of a mobile phone flash. The light of a mobile phone flash is very damaging for the eyes. The girl is wearing glasses because of this.

Hussain (Male, 19, Zaatari), Mohammed (Male, 21, Zaatari)



When I took the tawjehe {final year exams}, my exams were during Ramadan. So I used to have to study after 12am. Last year, during Ramadan the electricity would turn off at around 2am.

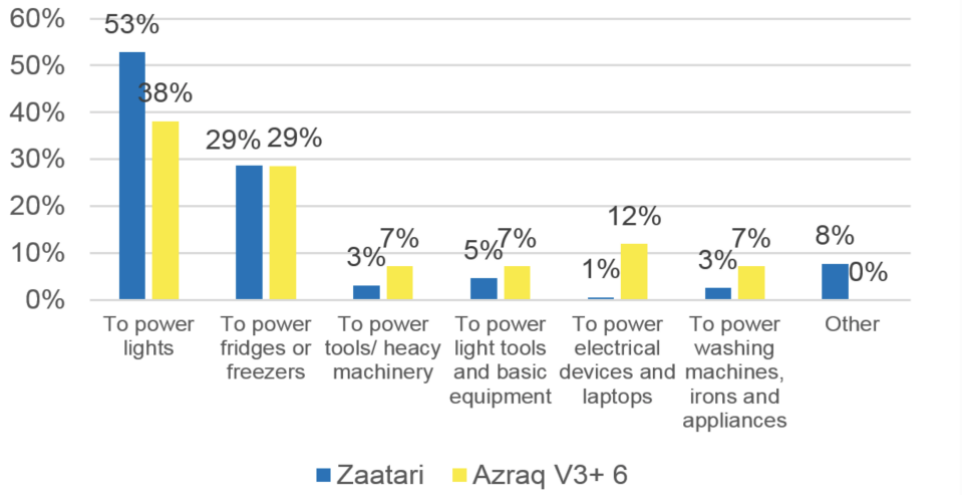
Qasem (Male, 20, Zaatari)

We showed my brother a game for children on a laptop. He learns from it and watches and spends his time on this. This means, he doesn't have to go out into the street and play, where its unsafe.

Asma (Female, 15, Zaatari)

LIVELIHOODS & ECONOMIC INCLUSION

Electricity is provided to shops in Azraq camp from the local grid, and shops and businesses in Zaatari provide their own electricity through generators, solar panels and batteries amongst others. It was found that 78% of shops in Zaatari, and 54% of shops in Azraq require electricity to operate; supporting new livelihood and economic inclusion opportunities while improving the overall diversity of both economic and social life in the camps.



Increased delivery scope and time

Increased access to electricity allows shops to both increase their scope of services through the connection of alternative devices, and lighting allows for longer operating hours. Lighting was identified as the most important (53% in Zaatari and 38% in Azraq) use of electricity, followed by refrigeration of goods. The market street in Zaatari operate until late into the evening, whereas in Azraq the markets are closed around 8pm (resulting in less need for light in Azraq).

Devices for learning and trainings

10% of survey respondents indicated that the use of electronic devices to complete online course or incentive based volunteering was important, while 9% stated this was important to undertake work or business activities. Equally, 14% of respondents claimed that YouTube (when internet access is available) was useful to learn new skills online.

A range of online courses are currently available through UNHCR partner community centers in both camps. Designed to increase beneficiaries capacities in the hope of securing new economic opportunities, the IBV system in Azraq also include online introduction courses on communication skills and Code of Conduct, CV creation and job interviews trainings, plus a series of other critical thinking, journalism, health (mental health for kids, cancer awareness, etc.) and First Aid (the most popular) courses. While these are predominately undertaken through the community centers, some beneficiaries are said to also undertake additional work on these via mobile devices at home.

LIVELIHOODS & ECONOMIC INCLUSION

This is my friend who said "I work in a shop that sells ice-cream' and all the equipment he uses to freeze and keep the ice-cream cold uses electricity so he needs the power.

Hassan Ghazy (V3, Azraq)

"I work in a shop that sells and fixes mobile devices and other things, and this type of work and equipment depends on electricity. So, if there is no electricity, it cannot work, so I become unemployed."

Hassan (Male, V3, 17, Azraq)

LIVELIHOODS & ECONOMIC INCLUSION

Unpaid Work – Household Chores

In both camps women, and in many cases also girls perform the majority of household chores and unpaid work. Women in FGD's would often suggest that they have little time for other activities' or participation in community event as they are too busy with household chores and domestic activities.

Some families indicated that they would give their daughters '1 day off a month' for free time. The provision of electricity and use of a range of devices to support domestic activities can provide much needed relief to particularly women and girls.

Washing machines are present in 60% of shelters in Zaatari and 44% of shelters in Azraq. They not only provide physical relief from working, but also create additional time for other activities. According to focus group findings hand--washing clothes for an average family is generally a daily activity that takes 2 – 3 hours. Household with a washing machine will use it 2 – 3 times on average each week.

12 hours
(on average) saved each week by washing clothes with a Washing Machine as opposed to hand-washing

This results in (an estimated) accumulated average of 12 hours saved for women each week. FGD's also suggested this minimized the impacts of physical repetitive stress on the body, particularly for older women, and also minimizes skin issues with detergents and damage to skin on hands and forearms.

As primary child minders, the provision of television also takes a burden off mothers who can undertake other activities with the knowledge children are save inside.

This mother really tires herself out during the day because of the washing. When electricity comes at sunset, she struggles to find time to cook dinner or see her children. She won't finish.

Rama (Female, 16, Zaatari)

OPERATIONAL IMPACTS

Financial Impacts and Cost Savings

The financial impacts of the renewable energy infrastructure in the camps may not have an immediate effect on beneficiaries, however, the cost saving generated of the operation does mean that funds can be allocated to other areas to service refugees in the camps.

At present, based on the current tariff of 0.26JD/watt (0.37USD) Azraq solar plant is saving UNHCR approximately $2M annuals. Due to the increased size of Zaatari solar infrastructure, the KfW plant has a cost saving of approximately $5M annually.

With a construction of $1.4/watt and $1.16/watt in Azraq and Zaatari respectively, this correlates to a return on invest within 3 years in Azraq and 5 years in Zaatari. While this does not cover the overall electricity usage of beneficiaries in each camp (and this will continue to increase as refugees use more electricity (as is current trends) it provides large cost saving for the operation in future years, plus benefit for host communities once the operations ceases to manage these camps.

CO2 Reduction and Environmental Impact

Based on data available through online management portals in Azraq and Zaatari's solar plants UNHCR can monitor the reduction in CO2 based emissions from not using fossil fuel based electricity production.

In Azraq, the estimated 5,500MWh of renewable power is produced annuals (with the current 3.5MW plant) mitigates an estimated 4500 tons of CO2 being released into the atmosphere each year. Similarly, in Zaatari, the estimated 23,000MWh of renewable power produced annuals (with the 12.0MW plant) mitigates an estimated 15,600 tons of CO2 annually. Overall UNHCR Jordan operation is therefore reducing their carbon footprint by over 20,000 tons each year.

20,100
tons of CO2 is
equal to
46,660
barrels of oil
consumed

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