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IOM DISPLACEMENT TRACKING MATRIX

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DTM MULTI-SECTORAL LOCATION ASSESSMENT ROUND 2

SUMMARY REPORT ON ENERGY ACCESS

Mozambique – Cabo Delgado and Nampula

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Caption: Solar Lantern use in a resettlement site.

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ACKNOWLEDGEMENTS

This report was prepared by Anaïs Matthey-Junod and Adam Ostaszewski, both NORCAP Deployees as Energy Experts to IOM Headquarters, in collaboration with IOM Mozambique team, including Isaac Mwangi (Energy Officer) and Alberto Goudinho (National Energy Project Officer), and based on the DTM data collection led by Mohamed Bakr (DTM Coordinator), and coordinated by Sascha Nlabu (Head of Programmes and Operations). The authors also thank DTM and CCCM colleagues who offered valuable feedback on the draft.

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1. GENERAL OVERVIEW

This report is a summary of the analysis of the second data collection exercise (Round 2) of Displacement Tracking Matrix (DTM) Multi-Sectoral Location Assessment (MLSA) in the Northern provinces of Mozambique that specifically includes energy-related questions.

The assessment was conducted through key informant interviews in a total of 26 locations, including 25 locations in the Province of Cabo Delgado and 1 location in Nampula (see Figure 4). The assessment was done between the 13th and the 23rd of April 2021. More information on the assessment methodology can be found in the Section 7.

In total, these 26 locations host 91,310 individuals (23,335 households).

Definitions

- ***Temporary Centers*** are buildings that have been repurposed temporarily to host IDPs (e.g., school).
- ***Relocation Sites*** are sites identified for people to be resettled.

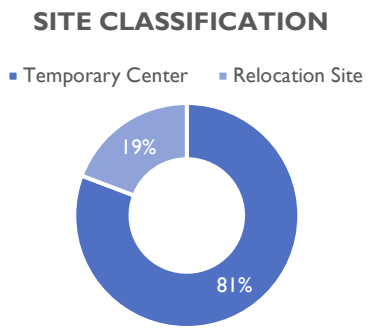


Figure 1: Breakdown of the type of sites assesed

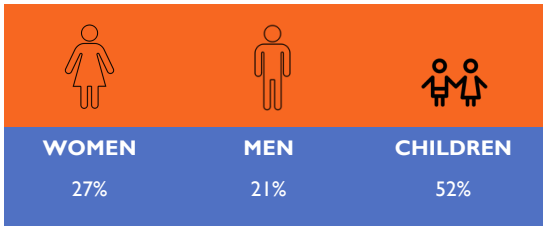


Figure 2: Gender breakdown in all assessed locations

The summary report is organized according to two main topics (energy access at the household level and at the community facilities level) and six thematic areas (cooking, electricity, (household) lighting, space heating and cooling, streetlighting, and water, sanitation and hygiene (WASH). Electricity is often powering lighting, space heating and cooling, streetlighting, and sometimes cooking and WASH activities. However, when electricity access is unavailable, alternative energy sources such as fuel (wood, kerosene, etc.) or hand power (manual) are used. In this report, the five thematic areas (except electricity) are explored both in terms of electric and non-electric energy sources. Finally, electricity access can be on-grid or off-grid (solar home systems, diesel generators, etc.) while energy sources can either be fossil-fuel based, or clean and/or renewable.

It is important to highlight that energy access does not consist only of energy for cooking and basic lighting, but also energy for connectivity, productive uses, and basic services (education, health, WASH, etc.). Therefore, a holistic approach to evaluate the overall energy needs is used as an analytical framework in this report.

Energy access has long been defined as a binary issue (with access VS no access). However, there is a continuum of level of access that depends on many parameters. In order to reflect that, the ESMAP Programme from the World Bank has established a Multi-Tier Framework (MTF) that offers a more comprehensive definition and metric of energy access based on nine attributes of energy supply (see Figure 3[1]). This work is now recognized and adopted by the majority of development actors and the energy sector since its publication in 2015. Therefore, the DTM energy indicators have been defined to be aligned with the MTF and enable the evaluation of the (estimated) Tier of energy access.

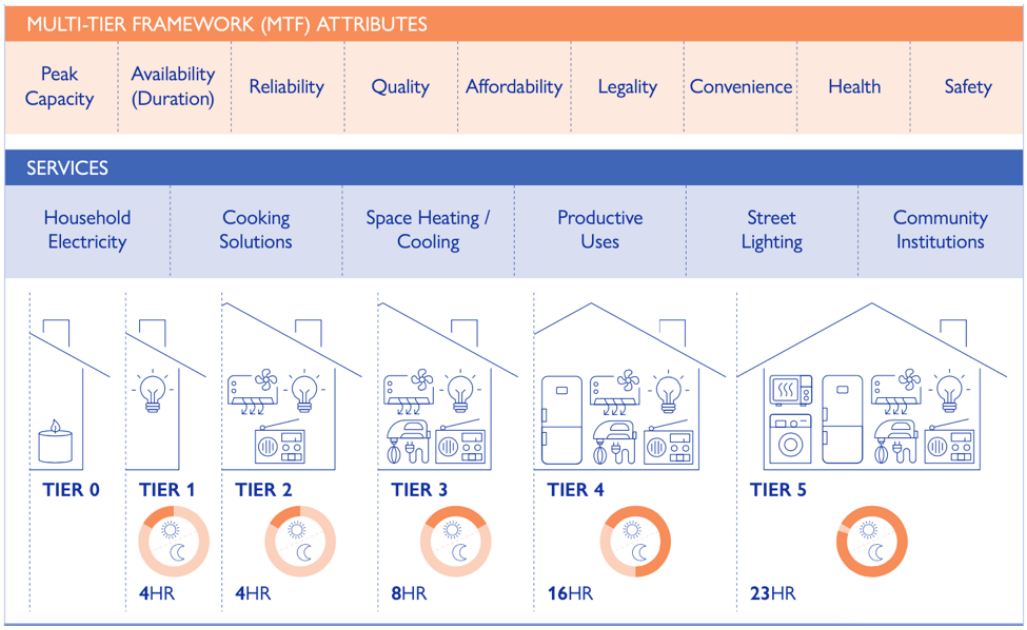


Figure 3: MTF attributes and energy services (adapted from Rysankova et al. (2016), slide 9)

[1] Reference: Rysankova, D., Portale, E., Carletto, G. (5 April 2016). Introduction to the Multi-Tier Framework. ESMAP. Available online: https://www.seforall.org/sites/default/files/MTFpresentation_SE4ALL_April5.PDF

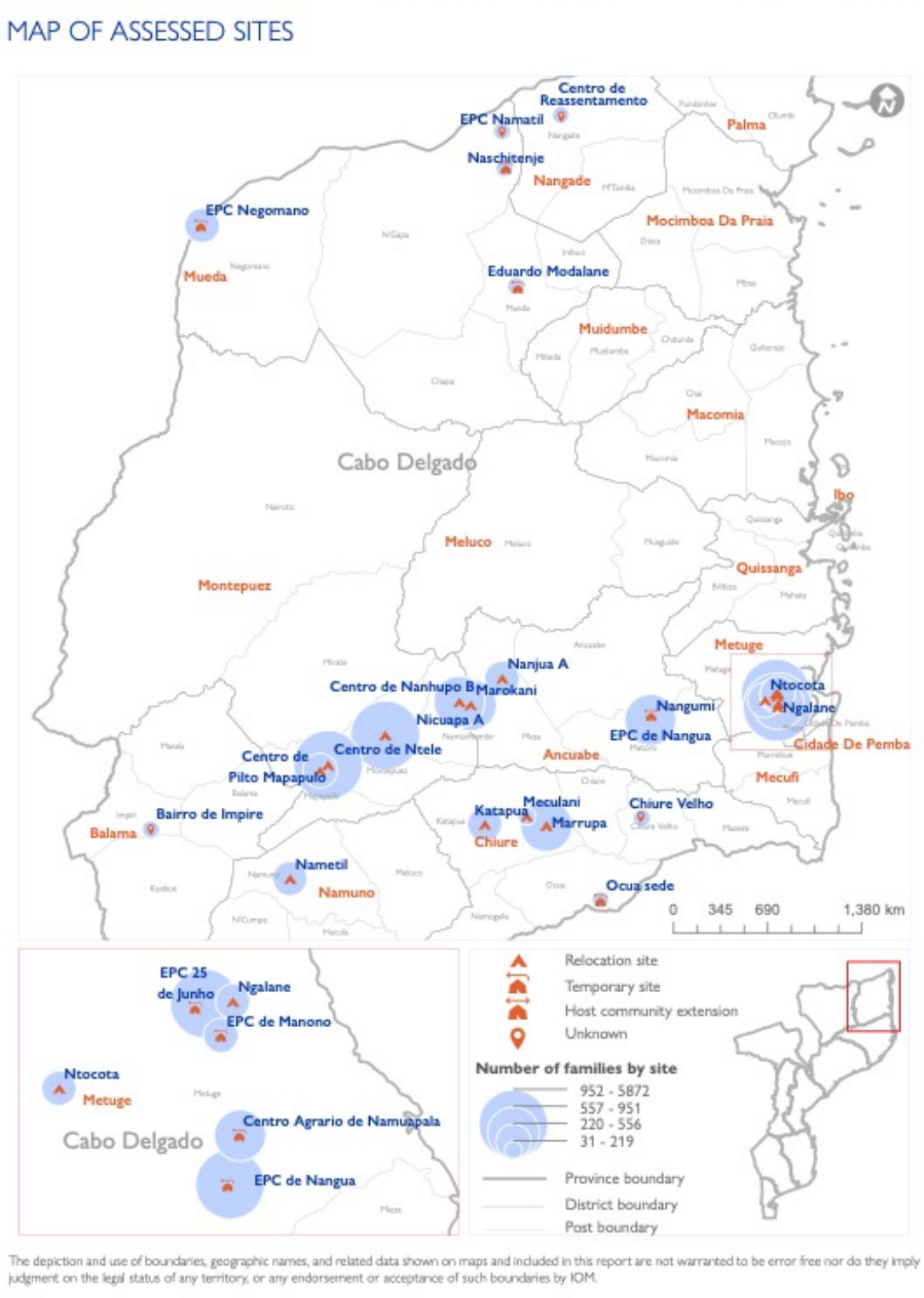
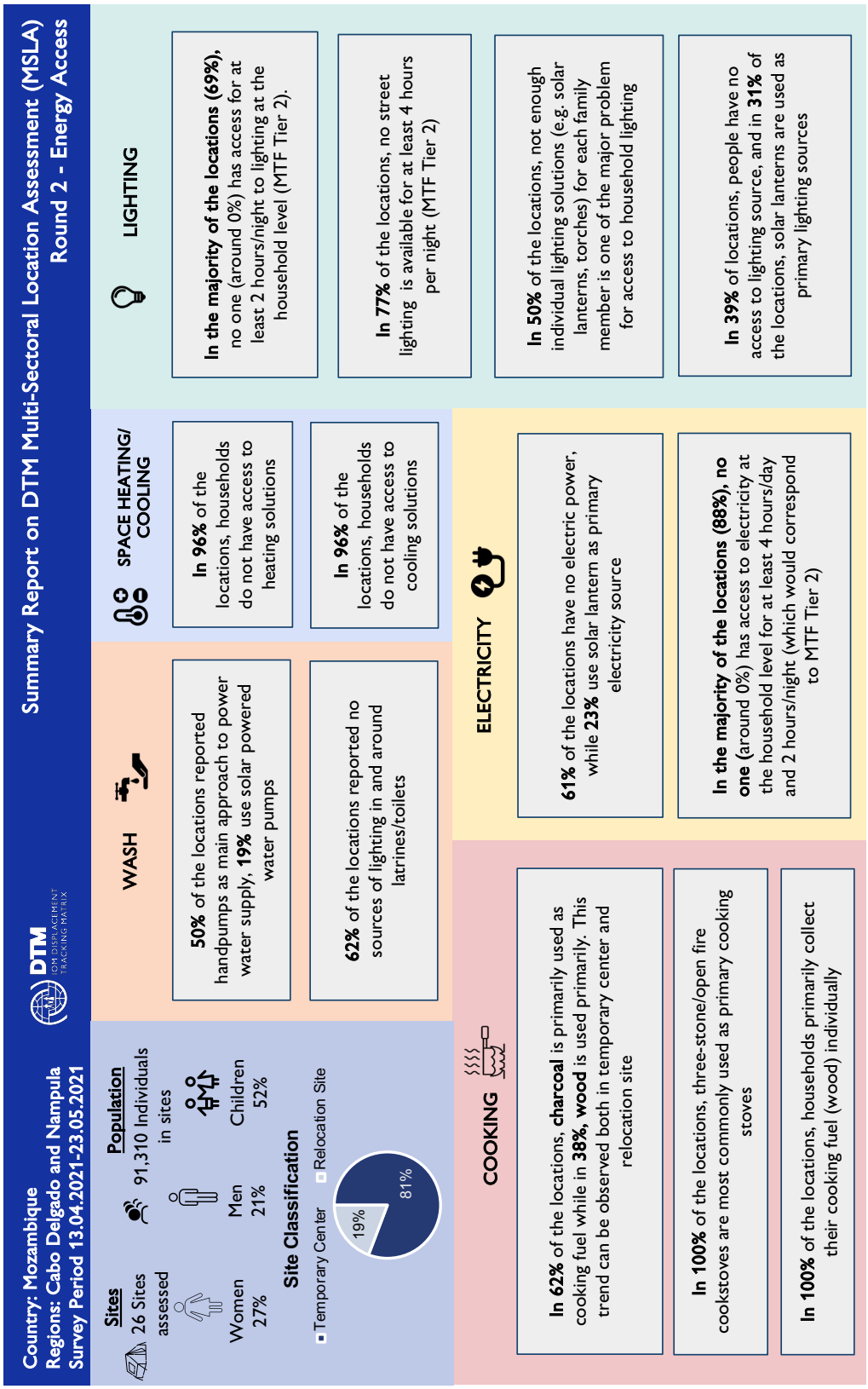


Figure 4: Map of assessed sites (Note: the site in Nampula is missing from the map)

2. SUMMARY OF THE MAIN FINDINGS



3. ENERGY ACCESS AT THE HOUSEHOLD[2] LEVEL

3.1 COOKING

MAIN FINDINGS

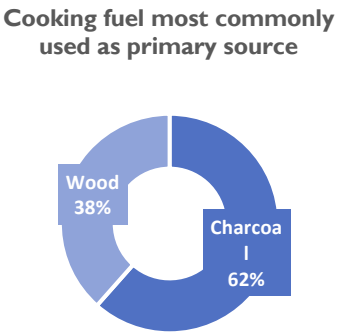


Figure 5: Breakdown of the cooking fuel most commonly used as primary source

It was reported that in 16 out of the 26 locations (62%), the communities most commonly use charcoal as their primary source of cooking fuel, whereas in 10 out of the 26 locations (38%) communities use wood. This trend is observed both in Relocation Sites (62% charcoal, 38% wood) and Temporary Centers (60% charcoal, 40% wood).

In addition, it was reported that in all of the locations, people individually collect their cooking fuel (wood).

Finally, it was found that three-stone/open fire cookstoves were most commonly used as a primary cooking mean in all of the 26 locations (100%[3]).

ANALYSIS AND COMPARISON

The first observation is that the results of the primary source of cooking fuel and primary cookstove do not seem to be perfectly consistent. Indeed, the use of charcoal is not optimal (both in terms of convenience and efficiency for cooking) with three-stone/open fire cookstove and is therefore rarely observed. Moreover, according to Tabrizi (2014)[4] and Makonese (2018)[5], in Mozambique, charcoal is most often used in combination with charcoal stove that are locally fabricated (see Section 8). This inconsistency might be caused by the fact that the suggested answers that were associated with the question on the primary cooking stove did not cover for such a type of stove explicitly. Despite that, it is assumed that the combination of charcoal and three-stone/open fire cookstove is still consistent.

Moreover, the main findings are aligned with the ones about the primary cooking stoves and fuels in other displacement settings across Mozambique, such as the nine resettlement sites in Sofala and Manica Provinces[6] during the first DTM MSLA exercise in December 2019 that specifically included energy-related

[2] Data collection was done at location level through key informant interviews, but questions regarding energy access were related to households' energy practices.

[3] In 1 location out of the 26, it was reported that solar cookstove was the primary cooking mean. However, it is inconsistent with the primary cooking fuel that was reported to be charcoal in that same location. Moreover, solar cooking is not common in the country and a desktop research showed that no program was found to have distributed or implemented solar cookstove in the region. Therefore, it is likely that three-stone/open fire cookstove is the most common mean as well. This inconsistency might be caused by a minimal key informant's credibility or an enumerator's misinterpretation.

[4] Reference: Tabrizi, S. (2014). Wood pellets in Mozambique – an alternative to charcoal and firewood for cooking in Mozambican households. Swedish University of Agricultural Sciences, Department of Energy and Technology.

[5] Reference: Makonese, T. (2018). Heterogeneous stove testing methods for the evaluation of domestic solid-fuel cookstoves. International Energy Journal, 18(2).

[6] Reference: Greenlight, October 2020. Assessment on energy access, use, needs, markets and challenges in resettlement sites of Sofala & Manica province, Mozambique.

questions. Indeed, charcoal stoves have only been reported in 6 per cent of the households compared to 92 per cent of wood stove (with base of three stones or tripod), and 2 per cent an improved wood stove.

Another point is that, since charcoal usually requires some production process with earth-mount kiln, it is unlikely that each household completes this process for itself but rather some local trading happens in the local market[7]. Therefore, it is most likely that some people in these communities produce charcoal at a small scale and sell it either at the local market or in the nearby towns for income[8].

Overall, one can expect that the cooking solutions used in these locations correspond to an estimated Tier 0 or Tier 1 of the Multi-Tier Framework (MTF)[9] established by ESMAP, a World Bank Program. This is below the current targets from the humanitarian energy sector who tend to aim for a minimum of Tier 2 of energy access. For example, UNHCR's *Global Strategy for Sustainable Energy 2019-2024*[10] states that a preference is given to "clean modern cooking energy over firewood or other traditional solid fuels" which applies to Tier 2 biomass cooking[11]. This is also aligned with UNHCR's Clean Energy Challenge, hosted by the Global Platform for Action (GPA) for Sustainable Energy in Displacement Settings. Until now, IOM has not states such clear objectives yet, but, as a co-founder and Steering Committee member of the GPA, is committed to contribute to the achievement of Sustainable Development Goal (SDG) 7 (universal access to clean and affordable energy) for displaced populations.

The fact that fuel wood and charcoal are used as primary energy sources for cooking combined with three-stone/open fire cookstove raises questions regarding the impacts on health (smoke inhalation), the environment (deforestation), and protection (Gender-Based Violence (GBV) during fuel collection). While no correlation can be demonstrated at this stage, these indirect issues should be kept in mind in further assessments.

3.2 ELECTRICITY

MAIN FINDINGS

It was reported that in 23 out of the 26 (88%) of the locations, no one ("around 0%" of the people) has access to electricity for at least four hours per day, including at least two hours during the night in their shelters. In the remaining three locations (8%), it was reported that a few people ("around 25%") had such level of access to electricity.

[7] Reference: Cuvilas C.A., Jirjis R and Lucas C. (2010) Energy situation in Mozambique: a review. Renewable and Sustainable Energy Reviews 14(7): 2139-2146

[8] Reference: Luz, A. C., Baumert, S., Fisher, J., Grundy, I., Matediane, M., Patenaude, G., & Zorrilla-Miras, P. (2015, September). Charcoal production and trade in southern Mozambique: historical trends and present scenarios. In *XIV World Forestry Congress, Durban, South Africa, 7–11 September*.

[9] Reference: Bhatia and Angelou,2015. *Beyond Connections: Energy Access Redefined*. ESMAP. Available at: https://openknowledge.worldbank.org/handle/10986/24368

[10] UNHCR (2019). Global Strategy for Sustainable Energy. Available at: https://www.unhcr.org/partners/projects/5db16a4a4/global-strategy-for-sustainable-energy.html

[11] Reference: Tran, A., To, L. S., & Bisaga, I. (2020). Landscape Analysis of Modern Energy Cooking in Displacement Settings. MECS. Loughborough University.

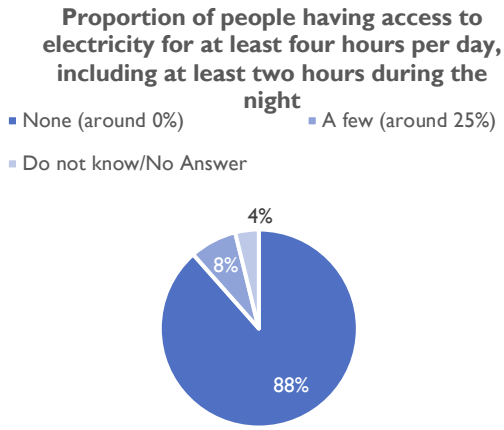


Figure 7: Breakdown of locations with households having access to electricity for at least four hours per day, including at least two hours during the night in the shelters

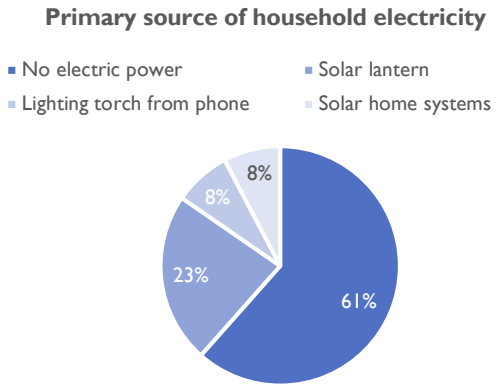


Figure 6: Breakdown of the primary source of household electricity in all locations assessed

Regarding the primary source of energy, it was found that 16 out of 26 (61%) locations have no access to electric power at the household level. In 6 out of the 26 (23%) of the locations, solar lantern was found to be the primary source, while lighting torch from phone and solar home systems were found to be the primary source in two locations each (8%).

ANALYSIS AND COMPARISON

Access to electricity for at least four hours per day, including at least two hours during the night at the household level corresponds to a Tier 2 level according to the ESMAP MTF[12]. Similar to energy for cooking, Tier 2 household electricity access is also starting to be seen as a minimum standard to aim for in displacement settings. For example, UNHCR's *Global Strategy for Sustainable Energy 2019-2024*[13] defines that its third outcome should be that "refugees have access to 200 Wh/household/day, allowing for basic lighting and connectivity", which corresponds to Tier 2 electricity supply.

While a majority of the households use solar lantern or solar home systems in about 1/3 of these locations (31%), most of the people in these locations do not own solutions that provide four hours of electricity per day and two hours per night. It is not possible to evaluate the Tier level of the solar lantern and SHS but by cross-analyzing the two datapoints presented above, we can assume that none of these locations have Tier 2 access in terms of household electricity supply.

[12] Reference : Bhatia and Angelou,2015. *Beyond Connections: Energy Access Redefined*. ESMAP. Available at: https://openknowledge.worldbank.org/handle/10986/24368

[13] UNHCR (2019). Global Strategy for Sustainable Energy. Available at: https://www.unhcr.org/partners/projects/5db16a4a4/global-strategy-for-sustainable-energy.html

Finally, the distribution of the primary sources of electricity between the Temporary Centers and Relocations Sites might indicate that a larger share of people has access to solar solutions in Relocation Sites. This might be due to the fact that Relocation Sites benefit from a comprehensive site planning compared to Temporary Centers. However, only 5 Relocation Sites have been assessed compared to 21 Temporary Centers so it might not be representative. Therefore, no generalization can be made in terms of the difference between the two types of sites.

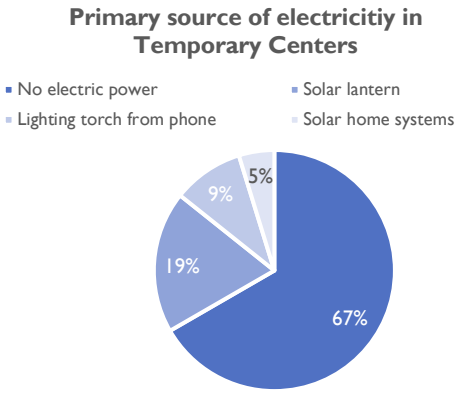


Figure 9: Breakdown of primary source of electricity in Temporary Centers

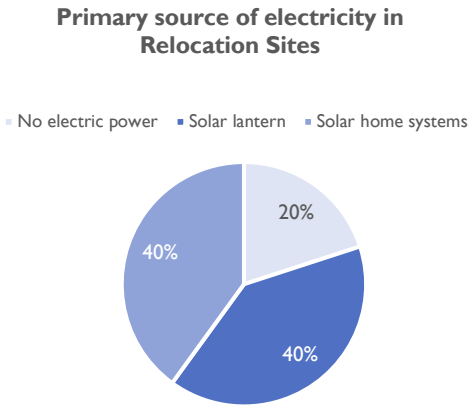


Figure 8: Breakdown of primary source of electricity in Relocation Sites

In both cases, limited access to electricity impacts the quality and duration of lighting, the access to basic connectivity (e.g. phone charging, radio), as well as the development of any productive uses at the household level. Therefore, a very low access to electricity prevents people from accessing digital services and communicating with family and friends to obtain information.

3.2.1 LIGHTING

MAIN FINDINGS

In 18 out of the 26 (69%) locations assessed, none ("around 0%") of the households have access to at least two hours of lighting (either electric or non-electric) during the night, while 8 locations (31%) report to that a few people ("around 25%") have access to at least that level of lighting.

In 10 out of the 26 (38%) locations assessed, none ("around 0%" of the people) of the households have access to lighting while 8 out of 26 (31%) primarily use solar lanterns as a lighting source. In two of the locations (7%) assessed, lighting torch from phone is used as a primary source of lighting, while the six remaining locations use flashlight, or non-electric sources such as burning sticks, candles, lighting from fires or cooking sources, or other source (4% each). The previous section highlighted that in 23 per cent of the locations solar lanterns were the primary source of electricity, which seems inconsistent with the figure for lighting (31% reported it as primary source). This may be due to some misinterpretation from the key informants or lack of clarity in the definition of electricity access from enumerators, which is often understood as a national/regional electricity grid connection. However, off-grid systems such as solar lanterns and solar home systems are also considered to provide electricity access, but at a lower tier level.

Being asked up to three answers, the major problems that affect the use of household lighting have been reported to be "not having enough individual lighting solutions (e.g. solar lanterns, torches) for each family member" in 50 per cent of the locations. Then, "unreliability" of household lighting has been mentioned in 31% of the locations as a major problem, while "cost of powering the lighting source" (19%), and "broken equipment" (15%).

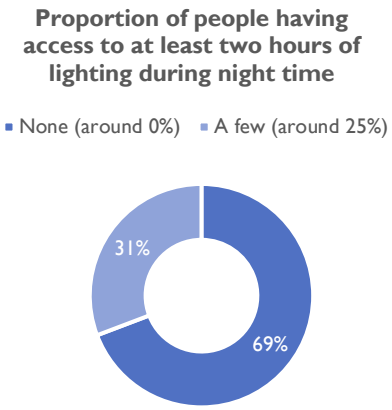


Figure 11: Breakdown of locations with people having access to lighting for at least two hours at night

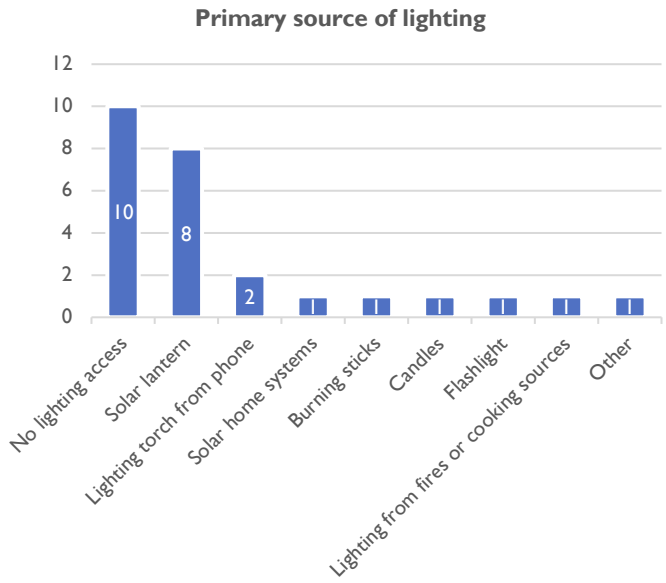


Figure 10: Breakdown of the primary source of lighting

ANALYSIS AND COMPARISON

Access to electrical lighting for at least two hours per night corresponds to a Tier 2 level according to the ESMAP MTF[14]. Based on the data displayed above, none of the locations assessed reach Tier 2. This is confirmed by results on the primary source of lighting which is inexistent (no access) in 38 per cent of the locations. In addition, the sources in 12 per cent of the locations are non-electric (including burning sticks, candles, and lighting from fires or cooking sources), which corresponds to Tier 0 as well. Then, lighting torch from phone and flashlight are task lighting solutions which also fall into Tier 0 or 1. Finally, the solar lantern and SHS used as primary source of lighting in 35 per cent of the locations assessed might correspond to solutions qualified for Tier 2, but it is not possible to tell with certainty as this would require a more granular dataset collected through household surveys.

All in all, the data regarding lighting are consistent with the data on electricity access. Among the 26 locations assessed, 10 (38%) assessed report that a majority of the households have no access to lighting. Besides, locations with a non-electric primary source of lighting have reported no access to electricity. For these locations, the usage of candles, burning sticks or lighting from fires or cooking sources raise some concerns regarding the safety including burning and fire risks. Moreover, it might have some impacts on the health of household members as they can induce indoor air pollution. A similar concern can be put

[14] Reference: Bhatia and Angelou,2015. *Beyond Connections: Energy Access Redefined*. ESMAP. Available at: https://openknowledge.worldbank.org/handle/10986/24368

forward with flashlight that usually use dry-cell batteries for which no recycling chain exists and might cause environmental damages if not correctly disposed of.

Finally, the major problems that affect the use of household lighting that, even if people might have a means to light their shelters for a period of time, it might not be sufficient to meet the individual needs of household members. For example, limited access to lighting might lead to restriction of activities such studying and productive activities, as well as protection risks including GBV.

3.2.2 SPACE HEATING AND COOLING

MAIN FINDINGS

In 25 out of the 26 locations assessed, it was reported that no one ("around 0%" of the people) has access to neither thermal space heaters nor space cooling solutions (such as fans, air coolers, or air conditioners) in their shelters. In only one location, EPC Namatil (Temporary Center), it was reported that all the people ("around 100%") have access to thermal space heaters while in Centro de Ntele (Relocation Site), a few people ("around 25%") have access to space cooling solutions.

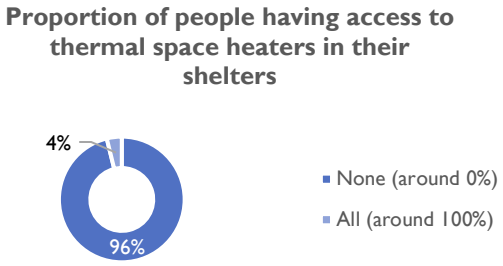


Figure 13: Breakdown of locations with thermal space heaters in shelters

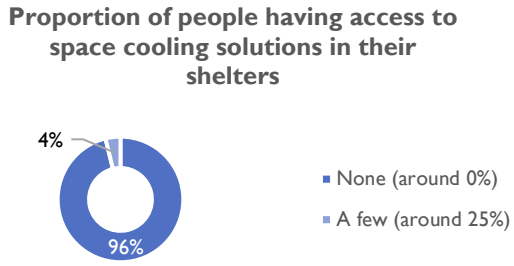


Figure 12: Breakdown of locations with space cooling solutions in shelters

ANALYSIS AND COMPARISON

The energy access levels in terms of space heating and cooling in these locations are very low (Tier 0). However, it might be explained by several arguments. First, with a low electricity access among the locations assessed, electric space heating/cooling solutions are unlikely to be common. Second, the climate context (sub-tropical climate, typical average temperatures 25-27°C in the summer and 20-23°C in winter) in this region of Mozambique potentially makes it possible to adapt to the conditions without resorting to using heating solutions. Yet, cooling solutions (that are usually powered by electricity) might still be relevant in this region of Mozambique. However, temporary shelters (e.g. tents) are not appropriate to install fans or air cooling/conditioning units due the weak structure of the house. Another potential explanation lies in the fact that it is possible that households use traditional/local construction techniques that help mitigate the need for such heating devices. Overall, it is assumed that space heating and cooling solutions are not priority needs to address and are currently almost inexistent.

4. ENERGY ACCESS AT THE COMMUNITY FACILITY LEVEL

4.1 STREETLIGHTING

MAIN FINDINGS

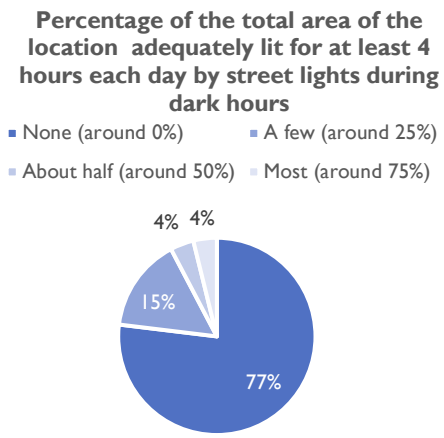


Figure 14: Breakdown of the locations with adequate streetlighting for at least four hours at time

It was found that in 20 out of the 26 (77%) locations, there is no ("around 0%") common area adequately lit for four hours each night by streetlights. In fourlocations (15%), it is reported that "around 25 %" of the total area is adequality lit for that amount of time, while in Centro de Reassentamento in Nangade, about half (around 50%) of the area is lit and in Mucopassa in Mueda, most of the area ("around 75%") is lit.

ANALYSIS AND COMPARISON

According to the MTF, Tier 2 level of access to streetlighting corresponds to "at least 25% of the location covered by functional street lamps" and it "functions for at least four night hours each day". Therefore, six locations (23%) are estimated to reach at least Tier 2. On the other hand, the majority of the locations are estimated to be below this level of streetlighting. Again, these findings are similar to the ones in other resettlement sites of Sofala & Manica provinces, where most of the locations have no security lighting in place.

Adequate public lighting is of importance for protection (e.g. mitigate GBV risks) and recreation time (e.g. gathering) as well as indirect lighting for households (e.g. studying) and small businesses (e.g. longer productive hours) in some cases.

4.2 WASH

MAIN FINDINGS

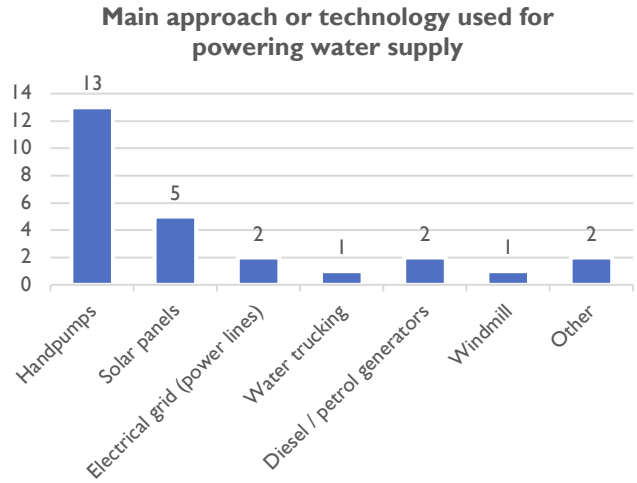


Figure 15: Breakdown of the main approach/technology used for powering water supply in the locations assessed

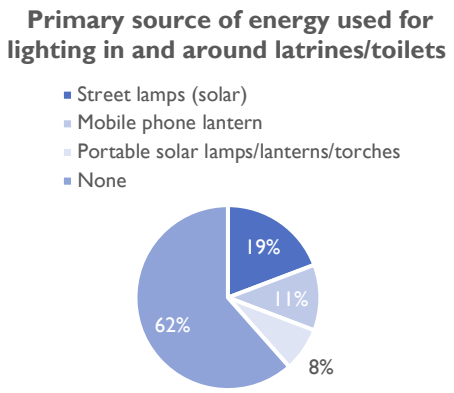


Figure 16: Breakdown of the primary energy source used for lighting in and around latrines/toilers in the locations assessed

It was reported that in 13 of the 26 locations (50%) assessed, handpumps are used as the main approach to supply water. In five locations (19%), solar panels are used as the main technology to power water supply, while in the remaining eight locations, diesel/petrol generators (8%), the electrical grid (7%), other (8%), windmill (4%) and water trucking (4%) are used.

In 16 locations out of the 26 (62%) assessed, it was found that no source of energy was used for lighting in and around latrines/toilets. In five locations (19%), streetlamps (solar) are primarily used while in three locations (11%) mobile phone lantern is used and in two locations (8%) portable solar lamps/lanterns/torches are used.

ANALYSIS AND COMPARISON

Despite a majority of the locations relying on hand-power, the share of locations with renewable energy-powered (solar and wind) water supply reaches 27 per cent. The installed capacity for electricity generation in Mozambique is made of 75 per cent of hydropower. We can also therefore assume that the electrical grid is mostly powered through a sustainable mix of energy sources. Finally, the lighting systems around latrines/toilets are found to be missing in most of the locations, which is aligned with the findings about general streetlighting.

Reliable water supply and lighting systems around WASH facilities are critical to ensure enough access to water as well as protection of the people when accessing the latrines/toilets at night.

5. SITE LEVEL ANALYSIS

5.1 AVERAGE ENERGY PROFILE

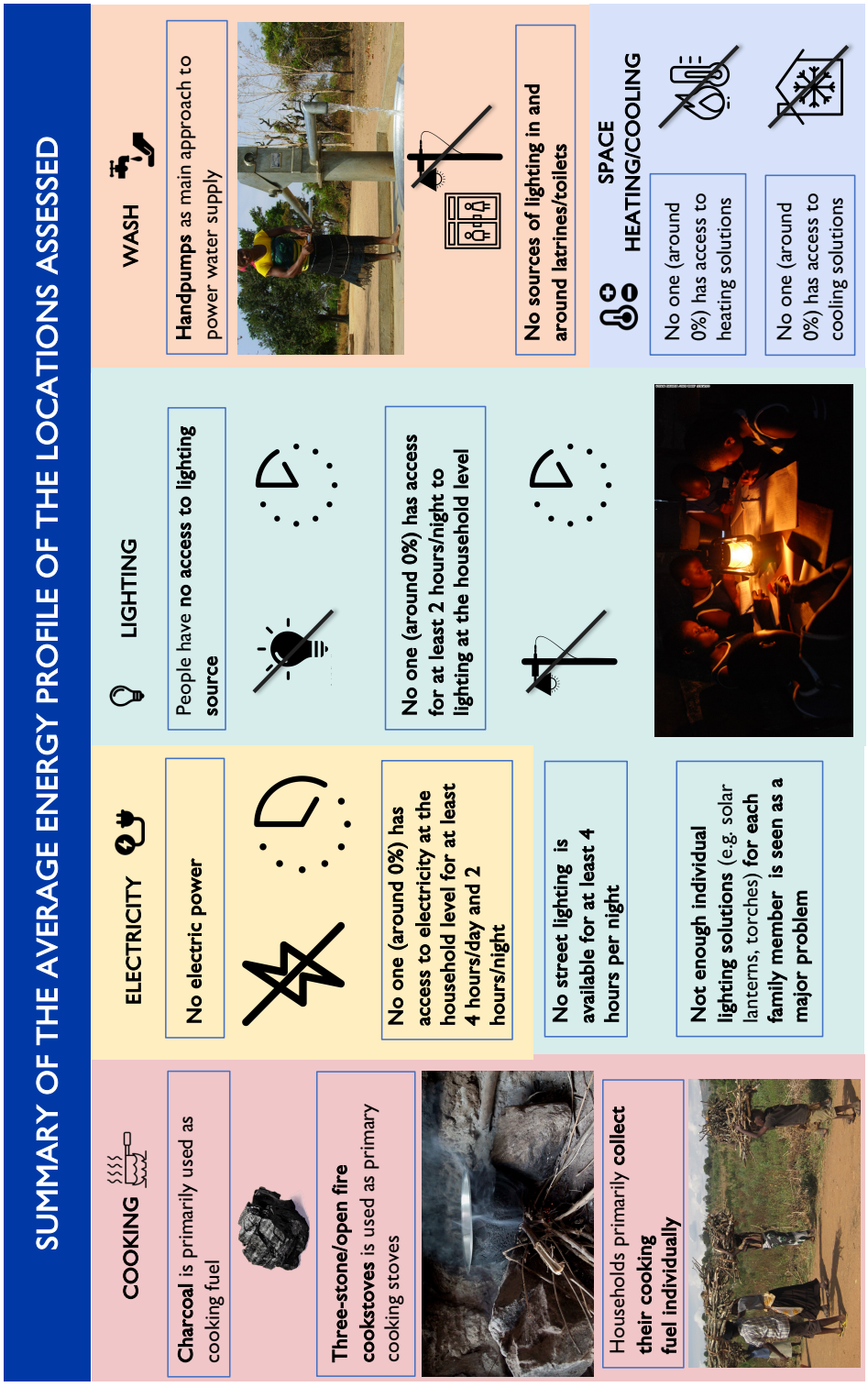


Figure 17: Summary of the average energy profile for the locations assessed

After analyzing the locations according to the five thematic areas and identifying what are the energy practices of the majority of the households, one can establish the average energy profile of the 26 locations assessed. The Figure above presents what the majority of the locations have reported and therefore offers a point of comparison between the average profile and specific sites. Thus, one can use this to identify the sites which generally have a lower or higher level of energy access on average.

In this assessment, it was found that the average location had access to some of the lowest Tier of energy access (Tier 0 and Tier 1). For example, out of all the suggested categories of answers for each questions administered, most of the key informants have reported that people in the location had "no electric power" and "no access to lighting source". Therefore, there is no location that has an energy access "Below Average", as it would imply a lower level than no access, which does not make sense. For that reason, in the present case, locations responding to "Average" in all aspects are considered the ones with the lowest levels of access compared to the rest.

5.2 SITE LEVEL COMPARISON

When looking at the sites more holistically across the various energy services studied, one can begin to categorize them in terms of general levels of access to energy-related services. Based on the Average Energy Profile seen in Figure 17, it gives an understanding of the level of access that the majority of sites have, which in this case can be interpreted as a "lowest common denominator" of access. One can then get an understanding of which sites have a level of access that is beyond this average level. Figure 19 ranks the sites by a Composite Score (on the far right of the table), which is derived by counting the number of data categories in which a site has a value that is outside of the average value on any one question. The average value itself has also been included for reference purposes.

Since there are 12 data categories considered, the scores can range between 0 (indicating that all data categories reflect the "average" value) and 12 (indicating that all data categories are outside of the average). Out of the 26 sites surveyed, the majority (11 sites - 42%) have a score of either 0 or 1, indicating a very poor level of energy access across all categories measured. Six sites have a score of either 2 or 3 which is just slightly better, and the rest (9 sites - 34%) have a score of either 4 or 5, with 5 being the highest score attained. Using this approach, one can prioritize the sites that have a lower overall score compared to others for further study, and potentially for energy interventions.

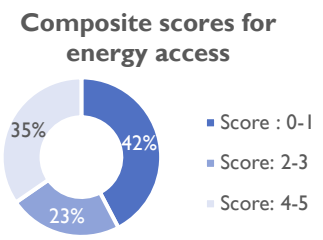


Figure 18: Breakdown of the composite scores for the locations assessed

In a similar fashion, one can compare the different categories of data and examine the ones where the data collected indicates a lower level of energy access compared to the rest. Here the Composite Score at the bottom of Figure 16, which ranges between 0 and 26 (due to 26 sites surveyed), can provide some additional insights. One can see that both Cooking and Heating/Cooling showed average scores of 0, indicating both a low level of energy access, based on the "average" survey results, but also that there was no variation at all between the level of access seen across all sites. In contrast, on the topics of Electricity, Lighting and WASH, one can see much more variation of the results, and many more instances where a site had a value that was outside of the "average." This view of data analysis could also help to prioritize thematic areas that are under-served as compared to others.

Site Name	Site Classification	Total number of IDPs	Percentage of Total Population	Cooking			Electricity		Lighting			Heating / Cooling		WASH		Composite Score (0-12)
				Which type of cooking fuel is most commonly used as a primary cooking fuel by the people of this location?	Which type of cooking stove is most commonly used as a primary cooking stove by the people of this location?	How do people in this location typically acquire their cooking fuels?	How many people at this location have access to electricity for at least four hours per day, including at least two hours during the night in their shelters?	What is the primary source of household electricity at this location?	How many people at this location have access to at least two hours of lighting in their shelters during night time?	What is the primary source of household lighting at this location?	What percentage of the total area of the location is adequately lit for at least 4 hours each day by street lights during dark hours?	How many people in this location have access to thermal space heaters in their shelters?	How many people in this location have access to space cooling solutions [such as fans, air coolers or air conditioner] in their shelters?	What is the main approach or technology used for powering water supply in this location?	What is the primary source of energy used for lighting in and around latrines/toilets?	
			Average Value	*Wood or Charcoal*	*Three-stone/Open fire*	*They individually collect it*	*None (around 0%)*	*No electric power*	*None (around 0%)*	*No lighting access*	*None (around 0%)*	*None (around 0%)*	*None (around 0%)*	*Handpumps*	*None*	
TEMPORARY CENTERS																
Civito	Temporary Center	502	0.5%	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	0
Centro de Nanhupo B	Temporary Center	3'496	3.8%	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Above Average	1
EPC de Manono	Temporary Center	1'755	1.9%	Average	Average	Average	Average	Average	Average	Above Average	Average	Average	Average	Average	Average	1
Ngalane	Temporary Center	1'755	1.9%	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Above Average	Average	1
Centro agrario de namuapala	Temporary Center	2'817	3.1%	Average	Average	Average	Average	Average	Above Average	Average	Average	Average	Average	Average	Average	1
25 de junho	Temporary Center	24'843	27.2%	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Above Average	Average	1
Eduardo	Temporary Center	187	0.2%	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Above Average	Average	1
Nanjua A	Temporary Center	1'471	1.6%	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Above Average	1
Nankumi	Temporary Center	2'184	2.4%	Average	Average	Average	Average	Average	Average	Above Average	Average	Average	Average	Average	Average	1
Nametil	Temporary Center	1'181	1.3%	Average	Average	Average	Average	Average	Average	Above Average	Average	Average	Average	Average	Average	1
Ntocota	Temporary Center	2'780	3.0%	Average	Average	Average	Average	Above Average	Average	Above Average	Average	Average	Average	Average	Average	2
Muanona	Temporary Center	2'992	3.3%	Average	Average	Average	Average	Above Average	Average	Above Average	Average	Average	Average	Average	Average	2
EPC Namatil	Temporary Center	215	0.2%	Average	Average	Average	Average	Average	Above Average	Average	Average	Average	Average	Average	Above Average	2
Ocua sede	Temporary Center	575	0.6%	Average	Average	Average	Average	Above Average	Above Average	Above Average	Average	Average	Average	Average	Average	3
Marokani	Temporary Center	5'784	6.3%	Average	Average	Average	Average	Average	Average	Above Average	Average	Average	Average	Above Average	Above Average	3
Epc Negomano	Temporary Center	513	0.6%	Average	Average	Average	Average	Average	Above Average	Average	Above Average	Average	Average	Above Average	Average	3
Centro de acomodação de Nangua	Temporary Center	11'072	12.1%	Average	Average	Average	Average	Above Average	Average	Above Average	Average	Average	Average	Above Average	Above Average	4
Marrupa	Temporary Center	3'724	4.1%	Average	Average	Average	Above Average	Above Average	Above Average	Above Average	Above Average	Average	Average	Average	Average	5
Centro de Reassentamento	Temporary Center	131	0.1%	Average	Average	Average	Average	Average	Above Average	Above Average	Above Average	Average	Average	Above Average	Above Average	5
Nrehile	Temporary Center	883	1.0%	Average	Average	Average	Above Average	Above Average	Above Average	Above Average	Average	Average	Average	Above Average	Average	5
Bairro de Impire	Temporary Center	759	0.8%	Average	Average	Average	Average	Above Average	Above Average	Above Average	Above Average	Average	Average	Above Average	Average	5
RELOCATION SITES																
Naschitenje	Relocation Site	586	0.6%	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Above Average	Average	1
Centro de Nacaca	Relocation Site	7'583	8.3%	Average	Average	Average	Average	Average	Average	Above Average	Above Average	Average	Average	Above Average	Above Average	4
Centro de piloto	Relocation Site	1'512	1.7%	Average	Average	Average	Average	Above Average	Average	Above Average	Average	Average	Average	Above Average	Above Average	4
Centro de Ntele	Relocation Site	9'404	10.3%	Average	Average	Average	Average	Above Average	Average	Above Average	Average	Average	Average	Above Average	Above Average	4
Mucopassa	Relocation Site	2'606	2.9%	Average	Average	Average	Average	Above Average	Average	Above Average	Above Average	Average	Average	Average	Above Average	4
			Composite Score (0-26)	0	0	0	2	10	8	16	6	0	0	13	10	

Figure 19: Summary of the composite scores for the locations assessed

6. GENERAL RECOMMENDATIONS AND NEXT STEPS

Short-term recommendations

- Given the unstable crisis situation in northern Mozambique, focus should continue on Non-Food Items (NFI) distributions that deliver sustainable solutions and enable increased protection, health and safety of the IDP and refugee populations, while also safeguarding the surrounding natural and environmental resources. These critical items should include high-quality and certified[15] solar lanterns and/or solar home systems (SHS), which could be used for lighting and connectivity. In general, the distribution of certified products with minimum standards will support a more sustainable approach and lead to better longer-term outcomes for the displaced population in terms of product life and usability. Additionally, this will lead to a more efficient use of donor funds, decreased waste (including problematic electronics waste) and the need for disposal of broken equipment.
- In addition to being certified, it is recommended that solar products distributed provide at least a Tier 1 level of electricity access according to the Multi-Tier Framework (MTF) from ESMAP (World Bank). (Tier 1 with a capacity to provide 4hrs of lighting and phone charging)
- Cooking solutions (including stoves and fuels) that are "cleaner" and more efficient should be prioritized when thinking of NFI distributions in order to limit health impacts (e.g. smoke inhalation), increase food security and minimize negative impacts to the immediate environment (e.g. deforestation, etc.).
- Ensure continued site planning, including the installation of adequate streetlighting for common areas as well as lighting around WASH service points and other critical locations in order to minimize risks of safety incidents and GBV.
- Prioritize sites that have been ranked very low on the site-level analysis for any interventions, and further study if needed. The following sites have shown a relatively lower level of energy access across the various categories that were studied:
    - Civito
    - Centro de Nanhupo B
    - EPC de Manono
    - Ngalane
    - Centro agrario de namuapala
    - 25 de junho
    - Eduardo
    - Nanjua A
    - Nankumi
    - Nametil
    - Ntocota
    - Muanona
    - EPC Namatil
    - Naschitenje

[15] For example, the Lighting Global Quality Standards for pico-PV products and solar home system kits or the quality standards in IEC TS 62257-9-8. See online data base here : https://data.verasol.org/

- Prioritize sites which have the highest relative populations in order to have a greater impact on a larger number of people:
    - 25 de junho (27%)
    - Centro de acomodação de Nangua (12%)
    - Marokani (6%)
    - Marrupa (4%)

Long-term recommendations

- In the longer term, coordinate with development and private sector actors to identify energy solutions for cooking, electricity, lighting, space cooling, streetlighting and WASH that are affordable, sustainable, safe and appropriate (in terms of policies, community acceptance, environmental impacts and technical feasibility) for the local context. Similarly, market-based approaches should be promoted wherever possible.

Further analysis

- Cross check the energy data collected against other data collected in this MSLA round that is related to other clusters (i.e. health, food security, shelter & NFI, protection, etc.), and examine any significant correlations or inconsistencies between these datasets.
- Conduct follow-up in-depth energy access studies and monitor changes through future MSLA rounds.

7. DATA COLLECTION METHODOLOGY

To ensure a more robust and targeted response for the humanitarian community, DTM provides key information and critical insights into the situation on internally displaced person (IDP), affected persons and returning populations across the affected areas. DTM Multi-Sectoral Location Assessment (MSLA) use Key informant interviews as a data collection method. DTM has an extensive network of trained enumerators that can be leveraged to acquire data in remote locations. These exercises provide in-depth information on mobility, needs, and vulnerabilities.

Limitations:

DTM MSLA is not an in-depth Sectoral Needs Assessment tool. It does not interview individuals or HH, but rather key informants. Moreover, DTM enumerators and key informants are not sectoral experts. DTM MSLA questions are designed to be answered by non-sectoral experts, in a way that results can be used by sectoral experts for analysis.

8. ANNEX

Types of potential charcoal stoves

Fig. 1. Charcoal stoves of various sizes on sale in Maputo market.

Figure 20: Reference: Tabrizi, S. (2014). Wood pellets in Mozambique – an alternative to charcoal and firewood for cooking in Mozambican households. Swedish University of Agricultural Sciences, Department of Energy and Technology.

Fig. 2. A photograph of the traditional metal Mozambican charcoal stove.

Figure 21: Reference: Makonese, T. (2018). Heterogeneous stove testing methods for the evaluation of domestic solid-fuel cookstoves. International Energy Journal, 18(2).