A ROADMAP FOR ENERGY ACCESS IN DISPLACEMENT SETTINGS: MOZAMBIQUE

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About the GPA

The **Global Platform for Action on Sustainable Energy in Displacement Settings** (GPA) is the global initiative to promote actions that enable sustainable energy access and use in displacement settings. The GPA strives to remove barriers to energy access in humanitarian settings by providing a collaborative agenda for energy, development, and humanitarian partners to deliver concrete actions of Sustainable Development Goal 7 (SDG 7) for displacement contexts. It promotes and contributes to the humanitarian sector's transition to renewable energy, which will increase efficiency and reduce costs and carbon emissions. Hosted by the United Nations Institute for Training and Research (UNITAR), the GPA Coordination Unit galvanises collective action towards the GPA's realisation.

About the READS Programme

The **Roadmaps for Energy Access in Displacement Settings (READS) Programme**, funded by the IKEA Foundation and implemented by the GPA Coordination Unit at UNITAR, will produce a "roadmap report" for each of the ten countries in its scope. The roadmap reports take stock of the state of energy access in displacement settings in each country with a focus on identifying gaps and high-impact project opportunities to increase sustainable energy access for displacement-affected communities.
These reports consolidate existing data and are informed by workshops with in-country stakeholders to develop and refine the research, including representatives of communities which have been affected by displacement, energy companies, humanitarian and development organisations, and governmental authorities, among others. The roadmap reports present project concepts that have been prioritised by local partners as being the most impactful areas for sustainable energy interventions in displacement contexts. Each roadmap report is produced in partnership with an organisation working in displacement contexts in the focus country.

About the READS Partner

The International Organization for Migration (IOM) is the UN's leading agency on the field of migration, working closely with its key stakeholders – migrants and Member States – to promote safe, orderly and regular migration. It does so by providing services and advice to governments, migrants and other stakeholders in order to maximize the benefits and opportunities of migration and reduce its challenges. Established in 1951, IOM now has 175 Member States, offices in over 580 field locations and over 20,000 staff – 90 percent of which are deployed in the field. The Organization's work at all levels is guided by IOM's Strategic Plan, which is built around three key objectives: saving lives and protecting people on the move, driving solutions to displacement, and facilitating pathways for regular migration. IOM leads environmental sustainability innovation for impact and scale in the humanitarian and migration management sector. Through innovative technology and finance solutions, IOM promotes the use of renewable energy in the communities that it serves, addressing immediate needs while implementing long-lasting solutions that benefit both communities and the environment. IOM collaborates with private sector and other key partners who can help accelerate scalable results by advancing high-potential initiatives.

About the IKEA Foundation

The **IKEA Foundation** is a strategic philanthropy that focuses its grant making efforts on tackling the two biggest threats to children's futures: poverty and climate change. It currently grants more than €200 million per year to help improve family incomes and quality of life while protecting the planet from climate change. Since 2009, the IKEA Foundation has granted more than €1.5 billion to create a better future for children and their families. In 2021 the Board of the IKEA Foundation decided to make an additional €1 billion available over the next five years to accelerate the reduction of greenhouse gas emissions.

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Abbreviations

ARENE	*Autoridade Reguladora de Energia*
ASWJ	*Ahlu Sunna Wal-Jammah*
CVA	*Cash and voucher assistance*
DTM	*Displacement Tracking Matrix*
EDM	*Electricidade de Moçambique*
FAO	*Food and Agriculture Organization of the United Nations*
FASER	*Fundo de Acesso Sustentável às Energias Renováveis*
FUNAE	*Fundo de Energia*
GIZ	*Deutsche Gesellschaft für Internationale Zusammenarbeit*
GW	*Gigawatt*
HCB	*Hidroeléctrica de Cahora Bassa*
ICS	*Improved cookstove*
IDP	*Interally displaced person*
IOM	*International Organization for Migration*
IPP	*Independent power project*
KII	*Key informant interview*
LPG	*Liquefied petroleum gas*
MINEC	*Ministry of Foreign Affairs and Cooperation*
MIREME	*Ministro dos Recursos Minerais e Energia*
MSLA	*Multi-Sectoral Location Assessment*
MZN	*Mozambican Metical*
NFI	*Non-food item*
NGO	*Non-governmental organisation*
NSAG	*Non-state armed group*
OCHA	*United Nations Office for the Coordination of Humanitarian Affairs*
PRCD	*Plan to Recover Cabo Delgado*
PSIDM	*Policy and Strategy for Internal Displacement Management*
PUE	*Productive uses of energy*
RBF	*Results-based finance*
READS	*Roadmaps for Energy Access in Displacement Settings*
SDG 7	*Sustainable Development Goal 7*
SEFORALL	*Sustainable Energy for All*
SHS	*Solar home system*
UNDP	*United Nations Development Programme*
UNHCR	*Office of the United Nations High Commissioner for Refugees*
USD	*United States Dollar*
WASH	*Water, Sanitation and Hygeine*

Overview of common energy terms

Energy technologies for electricity and cooking, and the terms used to describe them, can vary between countries, contexts, and organisations. The descriptions used in this report aim to conform with the most commonly-used definitions in displacement contexts but may differ from those used by other organisations.

TERM	DESCRIPTION
MULTI-TIER FRAMEWORK (MTF) FOR ACCESS TO ELECTRICITY	*Access to electricity is categorised across seven attributes: capacity, availability, reliability, quality, affordability, formality, and health and safety.* *Each attribute falls in a range from Tier 0 (no access) to Tier 5 (full access). The MTF was developed by the Energy Sector Management Assistance Program (ESMAP) at the World Bank to better categorise access beyond a simple binary comparison of "access or no access".*
SOLAR LANTERN	*Solar lanterns are an off-grid technology usually composed of a small solar panel, battery, and LED light integrated into a single unit.* *Solar lanterns can typically provide a few hours of light from a single charge and may have a USB connection for charging phones.* *Suitable for a single user or household, solar lanterns typically provide Tier 1 electricity access.*
SOLAR HOME SYSTEM (SHS)	*A solar home system (SHS) is an off-grid technology kit usually composed of a solar panel, battery, LED lights, switches and control systems, and often appliances.* *The size and services provided by a SHS can vary but typically offer several hours of electricity per day for lighting, phone charging, and appliances such as radios. SHS are used by both households and businesses, and sometimes by community facilities.* *SHS usually offer between Tier 1 and Tier 3 electricity access and can be acquired through upfront purchases or PayGo models.*
MINI-GRID	*Mini-grids are decentralised electricity networks which can operate independently of the national grid. They typically serve a community with tens to hundreds of connections.* *Mini-grids have a power source (usually solar or diesel), battery storage and a distribution network to supply electricity to customers, as well as power control systems.* *Mini-grids can be designed to provide any level of electricity access and usually provide Tier 1 to Tier 3. Customers could include households, businesses, community facilities, or other users. Customers typically pay fixed tariffs for electricity consumption, or daily rates.* *"Mini-grid" often refers to systems with capacities ranging from tens to hundreds of kilowatts, but generically could refer to smaller systems (also known as pico- or nano-grids) or larger ones, perhaps also with a connection to the national grid.*
STANDALONE SYSTEM	*A standalone system can provide electricity independent of the national grid, either fully off-grid or as a backup power source. Any type of electricity generation could supply a standalone system, but these are usually powered by diesel or solar with battery storage.* *Standalone systems typically refer to those which supply buildings, compounds, or operational purposes such as water pumps, but could include any off-grid system such as a mini-grid.*
NATIONAL GRID	*The national grid is the main electricity infrastructure of a country. It provides power through high-voltage transmission and distribution lines and is supplied by large-scale generation, such as power plants.* *The national grid can provide up to Tier 5 electricity access but, especially in remote areas and displacement contexts, its electricity supply may be unreliable or unavailable.*
OFF-GRID OR DECENTRALISED SYSTEM	*An off-grid or decentralised system can operate independently of the national grid network.* *The term "off-grid solar products" usually refers to consumer-focused systems, such as solar lanterns and SHS, whilst "decentralised systems" usually refers to larger systems such as mini-grids and standalone systems.*
PRODUCTIVE USES OF ENERGY (PUE)	*Productive uses of energy (PUE) include any applications of energy for businesses, income generation, or economic activity. This could include appliances or machinery to make work easier or more efficient, or to make new activities possible.* *PUE usually refers to electricity, but it also includes energy for cooking and other applications.*

Overview of common energy terms

TERM	DESCRIPTION
MULTI-TIER FRAMEWORK (MTF) FOR ACCESS TO COOKING	*Access to cooking is categorised across six attributes: exposure to harmful pollutants, energy efficiency, convenience of acquiring fuel and using the stove, safety, availability of fuel, and affordability.* *Each attribute falls in a range from Tier 0 (no access) to Tier 5 (full access). The MTF was developed by the ESMAP at the World Bank to better categorise access beyond a simple binary comparison of "access or no access".*
TRADITIONAL COOKING SYSTEMS	*Traditional forms of cooking include the use of simple stoves (such as open fires, three-stone fires, or mud stoves) and biomass fuels (such as firewood and charcoal). Traditional cooking systems are sometimes referred to as "basic" stoves and fuels.* *These cooking systems usually have high emissions and low efficiencies but are generally the cheapest and most accessible.*
CLEAN COOKING	*Clean cooking systems meet international standards for emissions at the point of use. These can include energy efficient or so-called modern forms of cooking including electric cooking, liquefied petroleum gas (LPG), and high-performing biomass stoves, such as some which use pellets.*
IMPROVED COOKSTOVES (ICS)	*ICS include a wide range of stoves which provide advantages over traditional stoves but generally do not reach higher tiers of access. ICS can use a variety of biomass fuels including firewood, charcoal, pellets, or briquettes.* *ICS can be produced locally or shipped from other locations and are generally lower-cost than other manufactured stoves.*
MODERN COOKING	*Modern cooking refers to stoves and fuels which meet Tier 4 standards across all attributes. These include LPG, biogas, electricity, and ethanol cooking systems.*
LPG STOVES	*Liquefied petroleum gas (LPG) stoves are clean cooking systems which use canisters of LPG as fuel. LPG stoves offer higher-tier cooking solutions but generally have high upfront costs and rely on LPG supply chains.* *LPG is a fossil fuel but is considered clean at the point of use.*
ELECTRIC COOKING	*Electric cooking includes several technologies. Energy-efficient electric pressure cookers (EPCs), slow cookers, and rice cookers are appliances which use electricity to heat a pot and are particularly well-suited to foods which require slower cooking, such as beans. These appliances can be powered by on- or off-grid systems but generally require a reliable supply of electricity.* *Electricity-assisted cooking stoves use electricity to improve the efficiency of cooking with biomass, for example using fans powered by solar panels to increase the airflow over the fuels. This can enable the stove to reach higher temperatures and efficiencies than traditional cooking systems, and it usually uses off-grid power.*
PRIMARY AND SECONDARY COOKING SYSTEMS	*Households may use more than one type of stove or fuel to meet their cooking needs. The primary stove and fuels are the most used ones, whilst the secondary stoves and fuels are used less frequently.*
STOVE STACKING	*Stove stacking describes a situation where a household has access to multiple forms of cooking systems. This is usually in reference to having an improved or clean cooking system but continuing to use a traditional cooking system. This could be due to various reasons, such as to cook different kinds of food, convenience, preferences, fuel shortages, or many other reasons.*

Executive Summary

Globally, over 100 million people have been forcibly displaced from their homes. Amongst those living in camps and settlements, more than 80% rely on cooking with firewood and open fires for cooking, whilst over 90% lack access to electricity. Sustainable Development Goal 7 (SDG 7) calls for universal access to affordable, reliable, sustainable, and modern energy for all by 2030 – including communities affected by displacement – and rapid progress is required to achieve this ambitious goal.

The Roadmaps for Energy Access in Displacement Settings (READS) Programme aims to support the achievement of SDG 7 in ten countries affected by forced displacement including Mozambique, which hosts more than 1.3 million internally displaced people and returnees. This report consolidates the status of energy access in displacement settings in Mozambique, provides an overview of the stakeholders working towards SDG 7, and presents opportunities for high-impact projects to support increased access to sustainable energy for displaced people and host communities.

Energy access in displacement settings in Mozambique

Household electricity

Access to electricity for households in displacement-affected areas is generally low, with most people reliant on torches, solar lanterns, or firewood for lighting at night. Lighting was ranked amongst the most significant priorities for households across many displaced communities, with households reporting that current levels of lighting were unsatisfactory and expressing a desire for improved services and access to new electrical appliances.

Affordability is the greatest barrier to improving electricity access for households, and the amounts that households are willing to pay for off-grid solar products are far below the market rates. This challenge is compounded by a lack of access to financial services, such as loans or savings groups, as well as the limited availability of solar technologies in displacement settings. Implementing results-based finance and long-term payment schemes could make solar products more affordable. Supporting companies to open sales outlets and repair facilities near to displacement-affected communities could also help to increase access rates.

Household cooking

Most households use firewood or charcoal to cook on three-stone stoves. Fuel is typically collected from the local environment, although some people purchase it. Households across the country reported using a variety of different coping mechanisms when cooking fuel was not available: common strategies included spending their savings, selling household assets, and reducing food portions.

Some households reported that they would be willing to pay for improved stoves but the cost of transitioning to cleaner cooking alternatives remains the biggest barrier that households face. READS workshop participants highlighted how a lack of financial resources and low incomes means that households are able to afford neither improved cookstoves nor the recurring costs of purchasing fuel, when it could be collected for free from the environment. Limited awareness of the health and financial benefits of clean cookstoves further limits their uptake. Subsidising improved cookstoves, especially for the most vulnerable households, could help to increase access to clean cooking and could be supported by customer financing mechanisms. ››

Executive Summary

Livelihoods and productive uses of energy

Most livelihoods activities in displacement settings are focused on agriculture or small-scale retail. Some businesses use electricity to support their operations, such as using basic lighting or offering phone charging. Refrigerators and freezers were the most desired appliances amongst entrepreneurs, followed by sound systems and televisions, whilst machinery for agriculture and carpentry were also prioritised for potential income generation if electricity were available.

The willingness to pay for such appliances was found to be well below their actual costs and access to finance for businesses, especially loans for equipment, was not commonly available. Improving financial services through formal lending or community savings groups could help to overcome the high upfront costs of buying new appliances. As business owners reported travelling significant distances to purchase equipment, supporting companies to establish operations in more remote areas could help to increase the accessibility of productive use appliances.

Community facilities and humanitarian operations

Assessments of resettlement sites found that most did not have access to public lighting. Around half of the sites used hand pumps for water, with the remainder using electricity from solar, diesel, or the national grid. Focus groups on community-scale energy access found that people prioritised energy for schools, water, streetlights, and the local marketplace. Separate analysis found that access to water was identified as the most urgent need in other resettlement sites and none of primary schools in the six sites that were surveyed had access to electricity.

The high upfront costs of electricity equipment for community facilities and public lighting, combined with limited funding from the government and other sources, make new systems difficult to implement. Meanwhile, the limited number that have been installed often suffer from a lack of maintenance or are in disrepair. Mobilising new funding and public-private partnerships for electricity infrastructure projects, especially standalone solar systems, would help to bring power to community facilities. Involving local communities throughout project implementation (from identifying the most important needs during design, to training people on equipment installation and maintenance) could help to support the longevity of this new infrastructure. ››

BARRIER	OPPORTUNITY
Low ability to pay and lack of access to financial services, such as loans and savings groups	Introduce subsidised products, work with financial organisations, and use results-based financing to build energy markets
Unavailability of energy products in displacement settings	Support companies to open outlets and run community engagement events
Lack of repair services for energy products	Help companies to establish maintenance hubs and train local technicians
High costs of electricity systems for community facilities and limited funding	Mobilise additional funding and encourage public-private partnerships

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Stakeholders in Mozambique

The humanitarian response extends across Mozambique with many provinces affected by displacement resulting from extreme weather events, such as cyclones, and conflict, especially in Cabo Delgado. The government has implemented many policies to support disaster preparedness and response and it coordinates sectoral assistance, with key roles played by humanitarian partners such as IOM.

Sustainable energy projects in displacement settings are rare but continued assessments by IOM through the Displacement Tracking Matrix have helped to analyse the levels of energy access and priorities for displaced communities. Few stakeholders focus on sustainable energy for displaced people specifically and there is limited private sector engagement in displacement-affected areas, although wider efforts to provide energy access in rural areas of Mozambique, supported by both the government and international agencies, could help to improve the situation.

Opportunities to scale up sustainable energy

There is great potential to expand access to sustainable energy in displacement settings in Mozambique. Access to sustainable energy, both for electricity services and clean cooking, is very low but this could be substantially enhanced through market systems approaches by improving access to consumer financing, supporting sales outlets in displacement-affected areas, and promoting the benefits of clean energy products. Working with local organisations and community members will be important in implementing sustainable energy projects that succeed in the long term.

The READS Programme hosted an engagement workshop in Maputo in March 2025 that brought together stakeholders working on energy in displacement settings across Mozambique. During a co-design session, participants established the foundations for high-impact project concepts to improve access to sustainable energy. These concepts were subsequently developed to showcase the potential investment opportunities and serve as a starting point for future support. A summary of these project concepts is shown in Table 1. ››

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There is great potential to improve sustainable energy access by enhancing market systems in displacement-affected areas.

Executive Summary

Improving access to sustainable energy in displacement contexts requires coordinated effort and a shared vision among all stakeholders. Based on the findings of this report, the READS Programme has outlined a roadmap for energy access in displacement settings in Mozambique with short- (2026-2027), medium- (2028-2029), and long-term (2030+) goals. These include electrification for schools and health centres, financing for household energy services, expanding solar power for agriculture, and integration sustainable energy into the emergency response.

The challenge is significant: achieving access to affordable, sustainable, reliable and modern energy for displaced people and host communities by 2030 will require more projects, activities, partnerships, coordination, and funding than ever before. Supporting sustainable energy projects for displacement-affected communities in Mozambique through new initiatives, greater investment, and strong collaborations will help to scale up access to electricity and clean cooking throughout the country.

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TABLE 1

High-impact project concepts to increase sustainable energy access with estimates of their potential reach, duration, budget, and scalability.

PROJECT	NAME	REACH	DURATION	BUDGET	SCALABILITY
1	*Standalone solar systems for education*	*20 solar systems*	*2 years*	*$600,000*	*High*
2	*Solar lighting for marketplaces*	*50 marketplaces*	*2 years*	*$500,000*	*Moderate*
3	*Financing for household energy*	*2,000 households*	*2 years*	*$400,000*	*High*
4	*Solar irrigation for improved agriculture*	*250 irrigation systems*	*3 years*	*$500,000*	*High*
5	*Standalone solar systems for primary health centres*	*50 health clinics*	*3 years*	*$2 million*	*Moderate*
6	*Rapidly deployable energy solutions for emergency situations*	*150 units*	*2 years*	*$4 million*	*High*

01

Setting the scene

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Setting the scene

Access to energy for Mozambique's 1.3 million internally displaced persons (IDPs) and returnees is low. Most households lack access to electricity for lighting and other basic services and rely on three-stone stoves and firewood for cooking. Energy use for livelihoods, such as through productive use appliances or larger equipment such as milling machines, is similarly limited. Schools in resettlement sites typically do not have access to electricity, and lighting in public areas is rare.

The uptake of sustainable energy solutions in hindered by high costs and limited financing options for both households and businesses alike. Some larger systems for community facilities, such as schools and health centres, have been implemented, but many are no longer functional because of insufficient maintenance and spare parts. Enhancing the affordability of sustainable energy for households and businesses (through demand-side financing and supply-side subsidies) could improve adoption. Partnering with the private sector could further unlock investments to improve health, education, and other essential services for people living in displacement-affected areas.

Addressing the challenge of achieving universal access to sustainable energy in displacement settings requires coordination at all levels – from local to global [1]. International targets for energy access are met through implementation on the ground with each country, region and community needing its own consideration and planning to reach this shared goal. Stakeholders from across the humanitarian and energy sectors have initiated projects aimed at improving energy access but these will require more investment and coordination to scale up. Furthermore, the amount of research and evidence needed to fully understand the energy needs and develop appropriate solutions does not match the scale of the challenge to inform sustainable energy scale-up across Mozambique's displacement settings.

Acknowledging this, the READS Programme aims to provide a country-level overview of sustainable energy in displacement settings. With the Programme working across ten countries, Mozambique is the ninth to be featured in a READS Roadmap Report alongside Kenya, Uganda, Rwanda, Lebanon, Ethiopia, Jordan, Nigeria, and Mauritania.

A goal of the READS Programme is to identify new opportunities for high-impact projects to increase sustainable energy access by consolidating the existing knowledge on sustainable energy in displacement settings. This includes published ››

At the READS workshop, stakeholders shared their experience through co-designing potential high-impact sustainable energy projects.

Setting the scene

literature – such as government policies, programme output reports, datasets, academic papers, and press releases – but also the experiences and expertise of practitioners working on project implementation and, most importantly, of community members.

In support of this, the READS Programme hosted a workshop in Maputo in March 2025 to engage with these stakeholders. Participants included representatives of communities which have been affected by displacement, the private sector, humanitarian organisations, and governmental authorities, among others.

Informed by published literature and the and experiences shared during this workshop, the READS Mozambique Roadmap Report highlights the most pressing gaps, barriers, and opportunities for sustainable energy in displacement settings, as well as the roles of the stakeholders involved. It also provides a spotlight for potential high-impact projects, co-designed in the workshop by stakeholders from different types of organisations, which could rapidly and radically improve sustainable energy access if they received support and investment.

The energy needs of each community, household, business, or institution will vary, as will the most effective ways of addressing them. This report aims to be as broad as possible in covering different kinds of energy access, and as comprehensive as possible in each topic, but is inherently limited by the nascent nature of research on sustainable energy in displacement settings and the uniqueness of each context. The authors hope that further research – perhaps focusing on specific areas of energy access, settlements, or the impact of new projects – can build on this report by diving deeper into these areas and promote a greater uptake of sustainable energy in displacement contexts. ●

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02

Forced displacement in Mozambique

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National overview

Located in Southeastern Africa, the Republic of Mozambique borders Tanzania, Malawi, Zambia, Zimbabwe, South Africa, and Eswatini and has a coastline of around 2,500 km along the Indian Ocean. The country is endowed with important natural resources, such as arable land, forestry, water, energy and mineral resources, as well as the third-largest reserves of natural gas on the continent [2].

Between 2009 and 2023, more than 6 million people were displaced across Southern Africa, with around 4.9 million displaced by disasters and 1.1 million by conflict [3]. Mozambique has been one of the countries most affected by both causes. IDPs have been forced to flee their homes and remain within their country of origin, either in host communities or displacement sites; returnees have returned from displacement areas to their original communities or residences but are yet to be fully reintegrated; and refugees are people who have been displaced across national borders.

The International Organization for Migration (IOM) records data on internal displacement around the world, including Mozambique, and its impact via its Displacement Tracking Matrix (DTM). Using data collected in February and March 2025, IOM reported that 609,243 IDPs and 701,462 returnees were residing in provinces around Mozambique (see Table 2) [4]. It noted that the number of IDPs has decreased by 18% since July 2024 and the number of returnees has increased by 15%, although variations in survey coverage limit direct comparisons. Conflict was identified as the main driver of displacement in Northern Mozambique while disasters and environmental shocks driving displacement in Central and South Mozambique.

Across the country, the IOM DTM found that 48% of the total displaced population reside in host communities and 52% in displacement sites [4]. This varied significantly between provinces, from 16% living in displacement camps in Nampula to 96% in Sofala, 98% in Zambezia, and 100% in Inhambane. With the largest number of IDPs living in Cabo Delgado, it was estimated that 89% of IDPs had been displaced more than once and 25% had been displaced more than three times.

In addition to displaced Mozambicans, the country also hosts 24,557 refugees and asylum seekers from other countries as of May 2025 [5]. Around one-third are originally from the Democratic Republic of the Congo (9,430 people) and Burundi (8,643), with the remainder from Rwanda (3,563), Somalia (2,322), Côte d'Ivoire (428), and other countries (171). ●

TABLE 2

Numbers of IDPs and returnees reported by IOM in 2025 [4].

REGION	PROVINCE	IDPS	RETURNEES	TOTAL
TOTAL	***All***	***609,243***	***701,462***	***1,310,705***
NORTHERN	*Cabo Delgado*	*428,945*	*661,801*	*1,090,746*
	Nampula	*29,172*	*33,472*	*62,644*
	Niassa	*3,628*	*3,968*	*7,596*
CENTRAL AND SOUTHERN	*Manica*	*34,513*	*249*	*34,762*
	Sofala	*92,650*	*1,972*	*94,622*
	Zambezia	*11,611*	*-*	*11,611*
	Tete	*8,089*	*-*	*8,089*
	Inhambane	*475*	*-*	*475*
	Gaza	*160*	*-*	*160*

Causes of displacement

Disaster-induced displacement

Mozambique is prone to cyclones and tropical storms, and the flooding caused as a result, which has affected provinces across the country (see Table 3). Since 2017, extreme weather events have affected millions of people, caused hundreds of deaths, and destroyed homes, schools, health centres, and other critical infrastructure [6-10]. Whilst cyclones cause extreme damage and displacement in a short period, many IDPs – such as hundreds of people in Inhambane province who remain displaced as a result of Cyclone Freddy in 2023 – have been unable to return to their homes [4]. Displacement is also caused by slow-onset disasters such as droughts, for example those which caused food insecurity (especially in Manica, Sofala, and Inhambane provinces) following the 2023-24 El Niño [11]. ››

TABLE 3

Extreme weather events since 2017 and their impacts in Mozambique.

NAME	YEAR	AREAS AFFECTED	IMPACT
CYCLONE DINEO	*2017*	*Inhambane Province (South)*	*548,566 people affected, 7 deaths, 90 injuries, and 33,014 houses destroyed (62,130 partially)*
CYCLONE IDAI	*2019*	*Central (Sofala, Zambezia), South (Inhambane), North (Tete)*	*1.5 million people affected, 600 deaths, and 1,600 injuries*
TROPICAL STORM ANA	*2022*	*Central (Zambezia), North (Nampula, Tete, Niassa, Sofala, Cabo Delgado)*	*141,483 people affected, 220 people injured, 25 deaths, 7,729 houses destroyed, 30 health centres damaged, 23 water supply systems destroyed, 144 power poles destroyed, and 2,475 classrooms destroyed*
CYCLONE GOMBE	*2022*	*North (Nampula), Central (Zambezia)*	*736,015 people affected, 63 deaths, 108 people injured, 141,854 houses destroyed, 69 health centres destroyed (total or partially), 21 water systems and 2,764 electricity poles destroyed, and 2,265 classrooms destroyed*
CYCLONE FREDDY	*2023*	*Central (Zambezia, Sofala), North (Tete, Niassa)*	*253,466 people affected and 53 deaths*

Causes of displacement

Conflict-induced displacement

From 2017 to 2023, internal displacement caused by conflict and violence reached its peak in 2020, with approximately 600,000 displacements [3], alongside significant damage to infrastructure. Conflict-related displacement is most common in the north of the country, particularly in Cabo Delgado, one of the poorest and most marginalised provinces.

Ahlu Sunna Wal-Jammah (ASWJ), a local non-state armed group (NSAG) also known as Al-Shabaab (sharing the same name but not formally related to the militant group based in Somalia), emerged in Cabo Delgado in 2017 [3]. ASWJ emerged in response to the exploration of natural gas and minerals in the province and promotes the narrative of Islamic governance as its solution to political exclusion, unemployment, and poverty, which have historically been more prevalent in the Muslim-majority areas in the north of the country [12]. The group affiliated with the Islamic State jihadist militant group in 2018.

In the five-year period to 2023, the ASWJ insurgency displaced more than 1 million people, of whom 29% were women and 50% children [13]. More than 600 women and girls were abducted in Cabo Delgado between 2018 and 2021, many of whom were abused or forced into marriage. Over 2,000 fatalities were recorded between 2017 and 2023, mostly of civilians, with the highest number in 2020. Education and health facilities, road and telecommunication systems, water points, and public administrative buildings were destroyed, whilst schools were closed which increased the risk of child labour and forced marriage. Clashes between government forces and insurgents in Cabo Delgado have continued into 2025.

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Policy frameworks for displaced populations

Mozambique has implemented several international policies to support disaster preparedness and response. These focus on providing mechanisms and strategies to address extreme weather and its effects on affected populations, and include:

- The United Nations Development Assistance Framework, which provides a system-wide overview of key UN activities and functions [14];
- The Disaster Recovery Framework, which assists in planning for and recovering from large-scale disasters) [15];
- The National Adaptation Programme of Action, which helps least developed countries adapt to climate change [16]; and
- The Post Cyclones Accommodation Plan, which provided actions to support resilient recovery of the country and its affected population after cyclones Idai and Kenneth [17].

Mozambique is also a signatory of international agreements on displacement, including the African Union's 2009 Convention for the Protection and Assistance of Internally Displaced Persons in Africa (the Kampala Convention), which it ››

TABLE 4

A summary of the roles of different stakeholders identified in the PSiDM [18].

STAKEHOLDER	ROLES
GOVERNMENT	*Coordinate efforts and sectoral response, ensure effective communication and data, define rules of management of accommodation centres, promote community-based organisations, develop procedures and regulations.*
PRIVATE SECTOR	*Collaborate with the government in implementing actions, programmes, and projects to assist IDPs.*
HUMANITARIAN AGENCIES	*Assist the government in mobilising resources and preventing future displacement, create the conditions for the normalisation of life, and collaborate with national sectors to strengthen local response capacities.*
DONORS AND INTERNATIONAL ORGANISATIONS	*Support institutional capacity building, provide sectoral support for IDP management and durable solutions.*
INTERNALLY DISPLACED PEOPLE	*Comply with rules and procedures, participate in training programmes, support their representatives in identifying resettlement sites and reporting malpractices, participate in monitoring and evaluation processes, and collaborate with authorities to return to places of origin if they so wish.*
HOST COMMUNITIES	*Host and make land available for IDPs, share infrastructure and everyday services, and support their representatives to identify places for resettlement and socio-economic activities.*
COMMUNITY AUTHORITIES	*Ensure compliance and social cohabitation between displaced and host communities, sensitise host communities to live with IDPs and support infrastructure construction, and support government and other bodies with monitoring and collecting data.*
NON-GOVERNMENTAL ORGANISATIONS	*Develop activities for humanitarian assistance (particularly for health, education, resettlement, family reunification, and infrastructure), and provide psychosocial support for IDPs.*
MEDIA	*Inform people about measures for mitigating displacement and response actions, and disseminate information provided by the authorities for IDP management and associated policies.*

Policy frameworks for displaced populations

adopted in 2021 [3]. Also in 2021, the Government approved the Policy and Strategy for Internal Displacement Management (PSiDM) [18]. The PSiDM aims to address existing displacement, guarantee assistance and protection, and promote reintegration of displaced people under the principles of human dignity, solidarity, sustainability, coordination, gender equity, and prioritisation of vulnerable groups. It also highlights the roles of different stakeholders, a selection of which are shown in Table 4.

Humanitarian organisations have their own strategies for responding to disasters and supporting displaced people. In 2016, IOM adopted a resilience-orientated approach to resolving displacement outlined in its Progressive Resolution of Displacement Situations Framework [19]. This aims to provide an adequate standard of living for crisis-affected and vulnerable populations, and IOM has advocated to include energy-related indicators included in the list of basic services in Mozambique.

IOM's Mozambique Crisis Response Plan 2025 aims to provide both immediate assistance and address the underlying causes of displacement with three priority objectives: saving lives and protecting people on the move, driving solutions to displacement, and facilitating pathways for regular migration [20]. IOM has identified peacebuilding and conflict reduction, protection, shelter and settlements, water, sanitation and hygiene (WASH), and data as key activity areas, with others including camp coordination and management, health, and community-driven development. The Crisis Response Plan builds on IOM's earlier Recovery and Resilience Operations Framework for 2020-2021, which was composed of four pillars: safe settlements and access to basic services, social cohesion and access to livelihoods, access to safe and dignified shelter, and disaster risk reduction [21].

UNHCR, meanwhile, works alongside the Instituto Nacional de Apoio aos Refugiados (National Institute for Refugee Support), under the Ministry of Interior, which is the lead authority for refugee affairs [22]. The UNHCR Mozambique Multi-Year Strategy 2024-2026 identifies four key areas to support displaced people: to ensure that they benefit from a favourable legal and protection environment and access to national systems; to provide a more predictable, coordinated, and sustainable response; to strengthen their self-reliance and decision-making capabilities; and to provide increased access to durable solutions including voluntary repatriation, resettlement, and local integration. It will do this through facilitating strategic partnerships, ensuring meaningful engagement with displaced people, and integrating localisation and national capacity building, amongst other objectives.

Some policies have focused on issues in specific provinces. The Plan to Recover Cabo Delgado (PRCD) was approved by the government in 2021 with goals to improve social cohesion and economic opportunities for IDPs and host communities [23]. The PRCD also aimed to repair and build public infrastructure, provide cash-for-work and vocational training, and supply agricultural inputs to the IDPs and host communities. The implementation of the PRCD has been criticised, however, for focusing its efforts on only two districts linked to natural gas exploitation projects (Palma and Mocimba da Praia) rather than the proposed six. As a result, other ››

Conflict, extreme weather events, and slow-onset disasters have led to displacement in Mozambique.

Policy frameworks for displaced populations

severely affected districts (Macomia, Quissanga, Muidumbe, and Nangade) together received only one-third of the total funding.

In 2023, the United Nations Development Programme (UNDP) and the Ministry of Foreign Affairs and Cooperation (MINEC) introduced the two-year Immediate Stabilization in Cabo Delgado Province project [24]. Based on the PRCD framework, the project intended to improve community security and create the foundations for social cohesion, peace, and development. It also aimed to ensure the provision of essential services through rehabilitation of basic infrastructure such as maternity wards, schools, street lighting, and access roads, as well as socio-economic support for affected individuals, their livelihoods, and communities.

Other strategies are in place for responding to disasters. The United Nations Office for the Coordination of Humanitarian Affairs (OCHA) updated its Anticipatory Action and Early Response Framework in 2025 which provides a pre-agreed action plan and associated financing to coordinate early responses to cyclones in Mozambique and supporting people affected or at risk [25]. The initiative covers six provinces (Cabo Delgado, Nampula, Zambezia, Sofala, Inhambane, and Gaza) and triggers actions based on the timing before or after a cyclone's landfall. Up to $6 million is available from the Central Emergency Response Fund to support communications and early messaging, temporary accommodation centres, in-kind assistance, and access to services such as WASH and protection. The Mozambican Red Cross activated its Cyclone Early Action Protocol on 8 March 2025 in response to Cyclone Jude [26]. ●

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Humanitarian support, income levels and access to financial services

In response to conflict- and climate-induced displacement, the national government and international humanitarian agencies have provided essential support to affected populations. The Mozambique Humanitarian Needs and Response Plan 2025, released by OCHA, estimated that a wide range of partners (71 humanitarian organisations, 17 local and 34 international NGOs, 7 UN agencies, and 13 government organisations) had reached 1.28 million people by the end of August 2024 [27]. It also stated that $376.5 million would be required to meet the most urgent needs of 1.45 million people in 2025, including support for livelihoods, agriculture, food security, health and education services, and protection.

Much of the humanitarian support has focused on conflict-affected areas in northern Mozambique. In 2021, for example, the Government launched a three-year, $300 million reconstruction plan for Cabo Delgado. Over 15,800 children benefited from UNICEF-supported immunisation programmes; more than 51,000 people received WASH services; 5,300 children in six districts, from both displaced and host communities, received psychosocial support; and 6,700 IDPs, of whom 46% were children from hard-to-reach districts, received birth certificates [28].

Other support has focused on longer-term assistance and development. In 2023, the Food and Agriculture Organization of the United Nations (FAO) provided around 155,000 IDPs, returnees, and host community members across northern Mozambique with vital agricultural livelihood assistance [29]. Around 5,400 households were provided with seeds, tools, and training in good agricultural practices to produce 1,700 tonnes of staple crops (maize and beans) to feed their families for up to a year. Households produced over 4,860 tonnes of vegetables and sold the surplus, providing an average income of $370 over four months. Additionally, 3,790 households received goats and 4,500 received hens and roosters which helped to diversify livelihoods and increase access to milk, meat, eggs, and income. Trainings on agriculture, livestock and fisheries were also provided to more than 17,400 households.

The Mozambique Humanitarian Needs and Response Plan 2025 highlights the potential for cash and voucher assistance (CVA) to provide flexible and efficient support for displacement-affected populations [27]. It states that the Instituto Nacional de Gestão e Redução do Risco de Desastres (National Institute for Disaster Risk Reduction and Management) provides in-kind assistance and has not been involved in CVA disbursement, but that vouchers were first used in the country in 2016-2017 in response to droughts and that donors and humanitarian partners are currently working towards scaling up CVA.

In 2023, Save the Children was one of the first NGOs to implement Cash Plus projects in Mozambique, which combine household cash transfers with complementary projects [30]. It provided unconditional cash transfers to support projects on preventing malnutrition for pregnant and lactating women (four monthly distributions of $74 per household), safe learning environments (two transfers totalling $138 per household), and responding to Cyclone Freddy ($172 per household). Save the Children reported benefits including an increase of 24% of households consuming a nutritionally adequate diet; 98% of households feeling that the cash had a positive impact and 100% feeling safe during the distribution process; and 95% of respondents receiving the full amount ››

Humanitarian support, income levels and access to financial services

without any delays or difficulties. Amongst its lessons learned, the organisation recommended conducting local market analysis to set the correct amount of assistance, being transparent about participant selection in consultation with communities, timing transfers to coincide with when purchases or services are needed, and providing user-friendly and confidential feedback mechanisms.

Since then, the amount of CVA in Mozambique has increased significantly. Between January and July 2025, 14 humanitarian partners provided CVA across nine districts totalling $10.5 million to 603,000 people, almost all for food security and livelihoods [31]. Most was provided to people affected by conflict ($4.6 million) and drought ($4.1 million) with the remainder supporting responses to disasters. Paper vouchers were used for the largest share of disbursed CVA (54%), followed by e-vouchers (37%), mobile money (9%), and direct cash payment (0.2%). ●

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03

National energy context of Mozambique

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National policy overview

Mozambique's overall energy mix is dominated by bioenergy, primarily used for household consumption for cooking [32]. Its electricity supply is predominantly hydropower (86% of total generation), with almost all the remainder supplied by oil and gas. Solar power and bioenergy contribute negligible amounts to the national power supply. The growing reliance on recently discovered fossil fuels, such as coal and gas, together with the low utilisation of solar power, currently impairs the country's long-term transition to clean energy [33]. Overall, the favourability of Mozambique's policy environment towards sustainable energy is broadly in line with other countries in Sub-Saharan Africa (Table 5).

Mozambique has promoted sustainable energy for many years. In 2009, it released the New and Renewable Energy Development Policy, which aimed to promote sustainable energy in rural areas, reduce environmental impacts, create markets for renewable energy, and contribute to the Millenium Development Goals (the precursor to the SDGs) [34]. Without an effective government policy for electrification, however, electricity access remained low and mainly concentrated in urban areas. By the end of 2014, the World Bank estimated that only 25.2% of households had access to the grid; around 70% of Mozambique's population lived in rural areas, yet only 1.3% of rural households used electricity for lighting [35]. Whilst policies have expanded energy access across the country, as of 2024, just 33% of the population had access to electricity and 6% had access to clean cooking (Table 6) [32].

In 2021, Sustainable Energy for All (SEforALL) and Dalberg assessed Mozambique's progress towards sustainable energy access [36]. Their report estimated that 50% of people would have electricity access in 2030 (38% though grid connections and 12% through off-grid solutions) under a business-as-usual scenario, with the remaining 50% needing to be made up of solar home system (SHS) solutions if universal access were to be achieved. The report also estimated that only 7% of people would have access to Tier 2 or 3 clean cooking under existing policies by 2030, and only 4.4% would have access to Tier 4. An estimated $1.07 billion would be required to achieve universal electricity access and $567 million for universal access to Tier 2 or Tier 3 cooking, the largest parts of which would be required to close the affordability gap. Providing universal access to Tier 4 cooking, meanwhile, was estimated to cost $8-12 billion. ››

TABLE 5

RISE Pillars for Mozambique and the regional and global averages.

RISE PILLAR	MOZAMBIQUE	SUB-SAHARAN AFRICA	GLOBAL
OVERALL	*37*	*39*	*56*
ELECTRICITY ACCESS	*67*	*54*	*62*
CLEAN COOKING	*39*	*32*	*30*
RENEWABLE ENERGY	*34*	*44*	*41*
ENERGY EFFICIENCY	*9*	*26*	*46*

National policy overview

In 2023, Mozambique released its Energy Transition Strategy and Just Energy Transition plan to guide the country's sustainable energy policies and investment [37, 38]. They outline objectives including national development to promote and accelerate universal clean energy access by 2030 and decrease carbon emissions; to position Mozambique as a regional low-carbon energy hub; to contribute to the global energy transition by exporting the country's natural gas resources; and to adopt clean energy for vehicles and decarbonising transport. Amongst other programmes, they aim to achieve these through expanding and improving the national grid, developing solar and wind energy, scaling up clean cooking solutions, developing biofuels, and supporting green industrialisation.

In pursuit of this, Mozambique cooperates with international partners such as Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). The joint Supporting Climate Policy and Energy Transition in Mozambique programme, implemented between 2023 and 2025, aims to promote the country's climate targets whilst developing its low-emissions pathways for clean energy [39]. The partnership aims to strengthen Mozambique's institutional capacities in the climate and energy sectors and relevant government ministries in contribution to its National Development Strategy 2015-2035, Mozambique's Nationally Determined Contribution, and 2030 Agenda.

TABLE 6

Selected SDG7 indicators for Mozambique and the regional and global averages.

SDG7 INDICATOR		MOZAMBIQUE	SUB-SAHARAN AFRICA	GLOBAL
ACCESS TO ELECTRICITY (%)	***Total***	***36.0***	***53.3***	***91.6***
	Rural	*8.9*	*33.2*	*84.3*
	Urban	*78.9*	*82.1*	*97.8*
ACCESS TO CLEAN COOKING	***Total***	***6.0***	***22.0***	***74.0***
	Rural	*0.2*	*8.5*	*54.4*
	Urban	*15.3*	*41.7*	*88.9*
RENEWABLE ENERGY (% FINAL CONSUMPTION)	-	*76.9*	*70.3*	*19.8*

Energy policies

Electrification policies and the national grid

Mozambique's national grid has a capacity of 2.8 GW, supplied mainly by hydropower, with the largest source being the Cahora Bassa hydropower plant operated by the government-owned Hidroeléctrica de Cahora Bassa (HCB) [40]. The country exports power to its neighbours, with 65% of HCB's generation sold to South Africa and the remainder supplied to northern regions of Mozambique and Zimbabwe. Overall the energy sector has transitioned from being primarily public funded to one encouraging public-private partnerships, under a new law introduced in 2011, creating a more diversified energy mix. In 2015, the first independent power projects (IPPs) were commissioned, and since 2022, smaller projects such as mini-grids have been exempt from the 2011 law to simplify their implementation.

The energy sector is overseen by MIREME (Ministro dos Recursos Minerais e Energia), with ARENE (Autoridade Reguladora de Energia) acting as the regulator [40]. EDM (Electricidade de Moçambique) is the national utility and sources electricity from HCB and IPPs while FUNAE (Fundo de Energia) is responsible for the off-grid sector. An overview of their roles are summarised in Table 7 [41].

Mozambique's Integrated Energy Master Plan (2018-2043) outlines the long-term trajectory for the national power system [40]. It proposes increasing generation capacity from 2.6 GW to 17.7 GW through a mixture of gas (8.5 GW), hydropower (4.3 GW), coal (1.4 GW), solar (530 MW), and wind (150 MW). The National Electrification Strategy (2018) outlines the pathway to universal electrification, through connections to both the national grid (70%) and off-grid solutions (30%) at a rate of 165,000 connections per year in 2018 to 350,000 in 2020 and 590,000 annually between 2025-2030.

The on-grid electricity sector continues to develop but faces challenges. With the growth of renewable energy and off-grid solutions, the Integrated Master Plan requires updates to better align on- and off-grid electrification [40]. Fiscal incentives for IPPs and clearer regulation of distributed generation could help scale private investment, while capacity building and technical assistance can support government stakeholders to achieve their ambitious goals for electrification. ››

TABLE 7

Selected government bodies associated with the sustainable energy transition and an overview of some of their responsibilities [41].

NAME	ACRONYM	OVERVIEW
MINISTRO DOS RECURSOS MINERAIS E ENERGIA (MINISTRY OF MINERAL RESOURCES AND ENERGY)	*MIREME*	*Responsible for national energy planning and policy; oversees operations of the power sector, renewables, and liquid fuel*
AUTORIDADE REGULADORA DE ENERGIA (ENERGY REGULATORY AUTHORITY)	*ARENE*	*Regulates the production, distribution, and commercialisation of electricity and liquid fuels; regulates subsectors including licensing, tariffs, and quality standards*
ELECTRICIDADE DE MOÇAMBIQUE (ELECTRICITY OF MOZAMBIQUE)	*EDM*	*State-owned, vertically-integrated electricity company; tasked with electricity generation, transmission, and distribution*
FUNDO DE ENERGIA (THE ENERGY FUND)	*FUNAE*	*Provides funding for and implementation of projects to increase energy access in rural and poor urban areas; promote sustainable energy for social and economic development*

Energy policies

Off-grid electrification and mini-grids

The 2018 National Electrification Strategy and its Energia Para Todos (Energy for All) programme, implemented by EDM and FUNAE, aim to provide universal electricity access by 2030 by expanding the existing electricity grid and implementing solar mini-grids and SHS in areas not yet covered by the national network [42]. The Strategy defines electricity access broadly as the provision of any form of electrical service, acknowledging that off-grid solutions may deliver lower service levels than grid supply, at least as a transitional step. In 2024, Energia Para Todos programme provided more than 895,000 people with access to electricity, including through 175,000 SHS. A total of 111 mini-grids had been installed, with 17 under construction and five in implementation, totalling an installed capacity of 11.6 MW [43].

The Strategy also highlights the roles of different stakeholders in achieving this expansion, including the private sector, which is expected to participate in planning, building and operating assets [42]. It also proposed the establishment of an Electrification Account to finance electricity access projects, especially the capital expenditure, and thereby reduce dependence on international partners and EDM's loss-making financial situation. Overall, the Strategy estimates the total cost to achieve universal access by 2030 to be $6.65 billion.

Mozambique has well-developed legislation and regulations governing the implementation of mini-grid systems. The Regulations For Energy Access in Off-Grid Areas in 2021 established rules for off-grid electrification and the development of mini-grids up to 10 MW [44]. These regulations cover a wide range of activities and projects aimed at providing sustainable energy access, including the production, distribution, storage, and sale of electricity – either individually or in combination.

Mini-grids are divided into three tiers based on capacity: up to 150 kW, 150 kW to 1 MW, and 1 MW to 10 MW. The smallest systems are exempt from establishment or operating licences but they must comply with safety and quality standards and undergo inspections from ARENE [44]. The regulations for mini-grids define procedures for applying for mini-grid concessions, interconnecting systems, managing grid expansion scenarios, and setting tariffs. Additional regulations on tariffs, interconnections, and licensing were introduced in 2022 and 2023 [45]. ››

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Energy policies

Whilst on-grid electrification and mini-grids have received policy support, smaller-scale off-grid solutions such as SHS have largely been market-driven, supported by international programmes. The BRILHO programme, led by SNV and funded by the UK and Sweden, has catalysed Mozambique's off-grid energy market since 2019 through results-based financing, grants, and technical assistance [46].

Before 2018, most SHS were funded by FUNAE and used in community facilities such as schools and hospitals [46]. After BRILHO's launch, quality-verified SHS sales rose significantly from 20,000 annually in 2018-19 to 140,000 between 2020-2024, peaking at 200,000 in 2023. SHS sales grew through 2020 during the COVID-19 pandemic (as a result of continued government and donor support for energy access) and in 2021 (through BRILHO supporting both local and international companies), but sales began to drop in 2022 following supply chain issues. This continued in 2023 owing to market uncertainties and a trend towards companies focusing on quality, rather than quantity, of sales and a phaseout of donor funding. Companies which were supported by BRILHO reported that ongoing challenges include low payment collection rates, the difficulty of sustaining PayGo for customers without results-based finance support, and the affordability gap, with SHS costing around $7 per month, typically double what most households could afford.

The Fundo de Acesso Sustentável às Energias Renováveis (FASER Fund), established by the Fundação para o Desenvolvimento da Comunidade and GIZ through the Energising Development (EnDev) and Grüne Bürgerenergie Programmes, provides results-based financing to companies and organisations working in market segments including standalone solar systems and energy for productive uses, as well as clean cooking [47]. This includes displacement settings, supported by a memorandum of understanding signed between the FASER Fund and IOM, for example through subsidies on SHS for households in resettlement areas. ››

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Energy policies

Clean cooking

Improving access to clean cooking has featured on Mozambique's political agenda for many years, including under the recent Just Energy Transition policy, but progress has been slow. In 2013, the country introduced a strategy for the conservation and sustainable use of biomass for the period 2014-25. This aimed to reduce firewood and charcoal use and strengthen a sustainable biomass value chain, amongst other goals, but progress was limited [48]. An assessment conducted in 2016 by the Business Environment Reform Facility found that most improved cookstoves (ICS) had been distributed by NGOs and that the overall market size was small and limited by low willingness to pay, weak national production capacity, high transport costs, and a lack of quality certification [49]. Imported ICS had seen some success, but this relied on subsidies from international organisations and weakened incentives for local producers to scale up.

From 2018 to 2020, market growth was limited owing to a lack of grant financing to support the entry of new companies or the scaling up of existing ones, as well as the reliance on higher-cost imported ICS, which resulted in only around 43,000 sales per year [46]. As for the off-grid electricity sector, from 2021 the BRILHO programme supported market development by assisting five incumbent companies and two new market entrants. Bolstered by funding from AECF and FASER, which had previously implemented financing support in 2018 and 2019 respectively, companies transitioned to local manufacturing for ICS. Sales increased to around 150,000 in 2022 and around 200,000 in 2023 and 2024, with BRILHO supporting around half of all reported sales in the country.

In Mozambique's displacement settings, carbon finance presents a promising avenue to expand access to clean cookstoves and reduce reliance on traditional biomass. However, for carbon finance to effectively reach displaced communities, which often face affordability and market access barriers, collaboration between humanitarian and development organisations and the private sector is essential. Such partnerships can help ensure that carbon-financed cookstove programmes are designed to meet the specific needs of vulnerable populations, while also leveraging private sector expertise in distribution, certification, and scaling. This approach aligns with the country's durable solutions agenda, which emphasises integrated, long-term strategies for displaced people, including access to basic services and sustainable livelihoods. By working together, these actors can maximise the impact of carbon finance, ensuring that the benefits of clean cooking and climate action are accessible to those most in need. Carbon finance can serve as an effective results-based finance mechanism to accelerate clean energy access, especially in displacement settings.

Some companies have also leveraged carbon finance to support their clean cooking initiatives. MozCarbon, the first ICS company in Mozambique, began selling ICS in 2014 and issued its first Gold Standard carbon credits in 2015 [46]. In 2020, MozCarbon established a local facility with capacity to produce 4,000 ICS per month, followed by a larger facility able to produce 10,000 ICS per month in 2021. Sales peaked at around 50,000 per year in 2023. However, the company has faced challenges with carbon credits: slow initial certification, low prices for African carbon credits, and wider negative global press towards clean cooking credits in 2023 (which followed an academic study which assessed the cookstove carbon credit market as a whole [50]) all affected its cashflow and operations. As of 2023, cookstove projects represented 29 of the 60 carbon projects in Mozambique registered with Verra and Gold Standard and were implemented by organisations including Carbonsink, Mozambique Carbon Initiative, Bridge Carbon (then called C-Quest Capital), Burn, and others [51]. ●

Carbon credits for sustainable energy access

A breakout group at the READS workshop discussed the potential for high-integrity carbon credits to support sustainable energy in displacement settings. At present this faces several challenges: carbon market processes are often bureaucratic and complex, projects need sufficiently high volumes of credits to be financially viable, and displacement settings can be volatile with communities on the move, amongst other issues. Despite this, carbon credits could provide an additional source of funding.

Carbon projects should help support a durable solution, which is achieved when IDPs no longer have specific assistance and protection needs linked to their displacement. Of the several criteria that should be met for durable solutions, the group discussed three and their relation to carbon projects:

- **Access to livelihoods and employment** can provide work opportunities in projects and new skills for the community. It can face challenges, however, from an existing lack of knowledge amongst project participants, potential discrimination, and people moving to other locations. As a result, projects should promote capacity building and work with communities planning to stay in the longer-term.
- **Social cohesion** can involve host and displaced communities working together towards common goals. Some carbon projects may discriminate by targeting only IDPs, however, and so both communities should be involved and engaged with throughout the project design process. Organisations could also look for ad hoc opportunities to improve social cohesion as projects progress.
- **Providing an adequate standard of living** is supported through modern technologies and access to energy. This is dependent on the proper use of new energy equipment, as well as sufficient maintenance and buy-in towards community projects. Improving community awareness and providing opportunities for capacity building and employment can help to strengthen this aspect.

Equitable profit sharing is an important component of carbon projects to ensure that all stakeholders (especially displacement-affected communities which generate the credits) are appropriately compensated. The group suggested that benefits could be distributed through funds managed by community members to reinvest in local activities, potentially with the support of local government or organisations, or through NGOs or civil society organisations. Fairness and transparency could be supported by ensuring that project data is available and easy to access, undertaking project audits through third parties, and engaging with the community for data validation. Meanwhile, promoting active consent and establishing grievance mechanisms could help to support the participation of local communities in decision making throughout the project duration.

It is important to include all members of the community in carbon projects. Some community members have particular needs and potential barriers to inclusion, and so may require specific solutions to support their involvement. The group identified these for four groups shown in Table 8.

Finally, the group explored the roles of humanitarian agencies such as IOM in developing high-integrity carbon markets. In the project design phase, participants suggested that the ››

Carbon credits for sustainable energy access

most beneficial support would be through coordination and consultation (both with local communities and government bodies), giving context and information for potential projects, and providing technical support and guidance on developing carbon projects. During project monitoring and reporting, meanwhile, humanitarian agencies can act as the focal point for third party verification, support access to data, provide credibility, and monitor the other aspects of the project not related to carbon credits.

The challenges identified by the workshop participants included limited funding, the brief timeframes of projects in displacement settings compared to typical carbon projects, and low interest from project developers at present. They suggested that humanitarian organisations could play a central role in mobilising resources for new projects – especially through raising awareness and connections with potential donors – and creating partnerships with developers to identify potential projects.

Carbon credits can offer new opportunities for funding sustainable energy projects in displacement settings. Providing incentives to work in these contexts and demonstrating the pathway to economies of scale will be critical to attract more investment and private sector engagement. Working with communities, as the generators of carbon credits, will be crucial, and humanitarian organisations are well-placed to act as central partners and interlocutors as this nascent area grows.

TABLE 8

The barriers to inclusion and potential solutions for women, youth, people with disabilities, and people with limited literacy.

GROUP	BARRIERS TO INCLUSION	POTENTIAL SOLUTIONS
WOMEN	*Limited literacy* *Cultural norms* *Excluded from decision making*	*Promote adult literacy* *Promote economic empowerment* *Include gender quotas* *Create awareness and opportunities for mixed activities*
YOUTH	*Lack of trust and interest in projects* *Low ability to pay* *Not a common target group*	*Provide employment opportunities* *Support capacity building and skills development*
PEOPLE WITH DISABILITIES	*Accessibility of technology and information* *Cultural norms* *Dependency on caregivers*	*Identify people with specific needs to include them in projects* *Develop ad hoc inclusion opportunities*
PEOPLE WITH LIMITED LITERACY	*Lack of confidence* *Difficulty in accessing written information*	*Promote adult literacy* *Support engagement and awareness raising*

04

Energy in displacement settings

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IOM undertakes regular rounds of its Displacement Tracking Matrix (DTM) assessments to collect data on key issues related to displacement-affected communities. Since 2021, these assessments have included information on energy access for displacement-affected communities, especially through rounds of its Multi-Sectoral Location Assessment (MSLA). A specific report on energy access in Cabo Delgado and Nampula provinces was published in August 2021 [52], whilst further MSLA rounds provided more limited insights into energy access. Rounds released in August 2024 focus on the Northern region (Cabo Delgado, Nampula, and Niassa) [53] and Central and Southern regions (Sofala, Manica, Zambezia, and Tete; Inhambane and Gaza) [54].

As some of the most recent and detailed assessments of energy access taken directly from displacement locations, this report relies heavily on the DTM MLSAs. The MLSAs are conducted at the settlement level through key informant interviews (KIIs) and focus group discussions, rather than household surveys, and include questions that are designed to be answered by non-experts. The information provided by the DTM MLSAs can therefore provide valuable insight into the general situation of energy access across settlements in different regions of Mozambique.

In addition, IOM has conducted several rounds of energy-focused activities. These have included:

- A survey of 366 households and KIIs across five resettlement sites in Sofala (Machonjova, Ndedja, Muda Nunes, Metuchira and Savane) conducted in 2022, selected to be a representative sample of 85 sites across Mozambique [55];
- A survey of 433 households and additional KIIs, surveys of businesses and community infrastructure, and focus group discussions, across six resettlement sites in Sofala (Mucinemue, Begaja, Bopira, Maxemedje) and Manica (Metxisso, Mucombe) conducted in 2023 [56]; and
- Two market dialogue events with a broad range of stakeholders (the private sector, UN agencies, NGOs, academia, and others) to explore issues related energy access, PUE, and community-scale electricity systems [57, 58].

These activities have been supported by NORCAP and Innovation Norway to improve energy access across resettlement sites and, over time, have developed into projects to implement improved cooking solutions, solar PUE, and mesh grids (interconnected SHS networks that can share and sell power between households) in Mucombe and Metxisso resettlement sites in Manica Province. Whilst this work has mainly focused on locations in Sofala and Manica provinces, these assessments also provide a broader picture of energy access and related issues in displacement contexts across Mozambique. ●

Assessments by IOM have provided insights into the energy needs and priorities of displacement-affected communities.

Electricity access for households

A study by the non-profit Observatório do Meio Rural (Rural Environment Observatory), undertaken in 2021, analysed the socio-economic conditions of IDPs in northern Cabo Delgado, including access to electricity [59]. It found that before the conflict, around half of the displaced people surveyed had access to the electricity network, particularly as many had been displaced from towns. Aside from IDPs who relocated to urban areas, rates of electricity access had significantly decreased to less than 15%, mostly provided by solar panels.

The IOM DTM MSLA conducted in Cabo Delgado and Nampula in 2021 found that 61% of sites generally had no access to electricity at the household level [52]. Around one in four sites mainly used solar lanterns (23%), with other sites relying primarily on lights from phones (8%) or SHS (8%). In almost all locations (88%), no one had access to electricity for at least four hours per day, with only a few people experiencing that level of service in other locations. Relocation sites, which benefit from comprehensive site planning, generally had better access than temporary centres: just 20% of relocation sites had no electric power compared to 67% of temporary centres, and they had higher uptakes of solar lanterns (40% compared to 19%) and SHS (20% compared to 5%).

Households in the five resettlement sites assessed in Sofala in 2022 generally used battery-powered torches (60%) as their primary source of lighting, followed by solar lanterns (14%), light from fires (9%), mobile phones (8%), SHS (3%) and candles (1%), with 73% using only one source of lighting [55]. Households generally used lighting for household chores (41%), for safety and protection (35%), and to help with cooking (9%) or studying (7%). Almost all respondents (95%) were unsatisfied with the level of lighting, which typically lasted only a few hours per day. Around one third of households spent nothing on ››

TABLE 9

The number of hours of lighting after dark in each site in Sofala and Manica [56].

SITE	BEGAJA	BOPIRA	MAXEMEDJE	MUCINEMUE	METXISSO	MUCOMBE	AVERAGE
LESS THAN 1 HOUR	*10%*	*23%*	*25%*	*54%*	*9%*	*21%*	***24%***
1-2 HOURS	*8%*	*9%*	*34%*	*10%*	*6%*	*18%*	***14%***
2-3 HOURS	*28%*	*35%*	*26%*	*17%*	*13%*	*9%*	***21%***
3-4 HOURS	*1%*	*4%*	*4%*	*1%*	*16%*	*9%*	***6%***
MORE THAN 4 HOURS	*53%*	*26%*	*1%*	*10%*	*49%*	*39%*	***30%***
NOT KNOWN	*0%*	*3%*	*9%*	*7%*	*7%*	*4%*	*5%*

Electricity access for households

lighting and one third between 51-100 Mozambican meticais (MZN, 63 MZN = USD 1) per month ($0.81-1.59), with an average of 108 MZN per month ($1.71). Households reported spending around 15 MZN ($0.24) on batteries every two weeks, which is cheaper than candles (20 MZN per week, $0.32) and kerosene lamps (40 MZN per week, $0.63).

Considering electricity overall, none of the five sites were connected to the national grid and the common sources of lighting (such as solar lanterns or light from fires) were usually unable to provide other electricity services [55]. Among respondents with access to power sources, lighting (66%), phone charging (31%), and powering radios (7%) were the most commonly used services. Those with SHS could power one (55%), two (27%), or three or more (18%) bulbs, mobile phones (45%), and radios (27%), and 54% of solar lanterns could charge phones. Households generally received SHS and solar lanterns as donations from humanitarian organisations (50% and 82% respectively) with the remainder purchased through cash or PayGo. Of the donated solar products, 63% no longer functioned, of which 35% were disposed of with general waste and 26% discarded in the local environment.

Households in the six sites analysed by IOM in Sofala and Manica in 2023 used firewood (53%), battery-powered torches (30%), solar lanterns (10%), small solar panels (5%) and candles (less than 1%) as their primary lighting sources [56]. This varied across sites: three sites wholly were wholly reliant on firewood, two mostly using ››

TABLE 10

Rankings of energy for lighting (amongst priority needs) and lighting and lamps (amongst NFIs) on a five-point scale from very insignificant (1.0) to very significant (5.0) [53, 54]. Entries are marked which were most highly ranked (**) or in the top three (*), alone or jointly.

REGION	PROVINCE	ENERGY FOR LIGHTING (PRIORITY NEEDS)	LIGHTING (NFI)	LAMPS (NFI)
NORTHERN	CABO DELGADO	*4.0*	*4.0**	*4.0*
	NAMPULA	*4.0**	*4.0**	*3.0*
	NIASSA	*4.8*	*5.0***	*4.6*
CENTRAL AND SOUTHERN	SOFALA	*3.4*	*3.5*	*3.9***
	MANICA	*4.9***	*4.9***	*4.5**
	ZAMBEZIA	*2.5*	*4.1**	*3.7*
	TETE	*3.2*	*3.9*	*4.2*
	INHAMBANE	*4.9***	*4.0***	*3.9*
	GAZA	*1.0*	-	*5.0***

Electricity access for households

battery torches, and one used a mix. One quarter of households received less than one hour of lighting after dark per day (24%) and slightly more received more than four hours (30%), and the remainder received a duration in between (see Table 9). In most sites, solar lanterns and SHS had been purchased in cash.

Using lighting to help with cooking, household chores, and nighttime navigation were the most common applications [55]. Most people (84%) were unsatisfied by their current level of brightness and 68% expressed a desire to improve it; 14% wanted to use electricity for other domestic appliances and 6% wanted it to establish a business. The most commonly desired appliances amongst households were televisions (42%), fridges (15%), radios (11%), and sound systems (9%). In willingness to pay assessments, households expressed greater interest in larger SHS packages, with 20% willing to pay 1,000-3,000 MZN ($16-48) and 33% willing to pay more than 6,000 MZN ($95). Only 10% of respondents were prepared to pay the full amount upfront, with most preferring payments over six months (24%), one year (27%), or two years (37%).

The IOM DTM MSLA released in August 2024 provides a province-wide overview of how the need for lighting ranks amongst other priorities, and the importance of lighting and lamps amongst other NFIs (see Table 10) [53, 54]. Overall, energy for lighting was ranked as a significant need in the Northern region, behind only food security, NFIs, and financial support, and above others including shelter, nutrition, and protection. In the Central and Southern region, it ranked as a lower priority overall but was the highest in Manica and Inhambane provinces. Lighting and lamps were ranked amongst the most significant needs within NFIs, alongside tarps, blankets, mosquito nets, and others. Additionally, a separate MSLA in 2025 found that energy for lighting was a high-priority need for returnees in Cabo Delgado, Sofala, and Manica [4].

IOM has used community engagement to raise awareness of energy access. In 2021, it trained 15 ambassadors to share information about energy-related projects and gather feedback and insights from community members [60]. The ambassadors were estimated to have reached 3,000 IDPs across four resettlement sites. ››

> "The information was very useful because we learned a lot. We have many people that say they have energy but don't know what to use it in. With the information we started to learn what we could gain with energy"
>
> – IDP in Mutua, Sofala [60]

Barriers to electricity access

Affordability is the biggest barrier to increasing electricity access for households. The study of five resettlement sites in Sofala found that households could not afford to purchase outright any of the SHS currently offered on the market [55]. The amount that households were willing to pay in instalments was eight times lower than the monthly fees for basic systems and 12 times lower for an SHS with a television. Around 20% of households were not willing to purchase any kind of solar product, as they go for many months without any income and are therefore hesitant to take on loans. Since current expenditure on lighting sources is so low, the study estimated that only around 15-30% of households would be able to afford solar kits without financial support.

These issues may be compounded by the limited availability of solar products currently being sold in displacement settings, as noted by READS workshop participants, as well as the low quality of some products available. Additional challenges such as delayed maintenance (as technicians need to travel from urban centres) also affect the perceived effectiveness of solar products.

A lack of access to financial services further impacts the affordability of electricity solutions. Across sites in Manica and Sofala, 62% of households had no access to any financial services and 82% had no access to savings facilities [56]. Mobile money (such as M-Pesa, M-Kesh, and E-Mola) was found to be available in some locations, however only one in four people have access to these services.

IOM's market dialogues identified challenges with implementing community-scale electricity networks [57]. In addition to the low ability and willingness of households to pay for electricity, the dialogues also highlighted technical issues such as the improper sizing of potential systems, low energy utilisation, theft and vandalism, and the limited geographical reach of networks.

Finally, READS workshop participants highlighted gender differences that affect access to electricity. In some cases, men in households are responsible for purchasing electricity products and when they are away, for example working elsewhere, other household members are unable to use them. Participants compared this to areas in Northen Mozambique, where it is more typical for women to manage the home, including the purchase of solar products. In general, it was shared that women were more likely to adopt new technologies such as solar products whereas men were more likely to have the financial means to invest in them.

OPPORTUNITIES

There is high demand for improved electricity services but the amounts that households are willing and able to pay fall far short of the costs offered by companies. Subsidising solar products, especially for the most vulnerable households, could reduce costs and make them more affordable. This could be implemented through results-based finance (RBF) mechanisms or voucher schemes to help build markets in displacement-affected areas. This could build on previous RBF schemes that have supported SHS implementation in several areas of Mozambique under the BRILHO programme [46]. Once the markets are established, the subsidies could be reassessed or phased out.

Introducing longer-term financing, such as Pay-Go with two-year instalment terms for SHS, could help make these systems more affordable to households [55]. This will likely incur higher overall costs because of interest, but it could make monthly payments more accessible for a greater proportion of households. Improving financial services, such as mobile money and community-based savings groups, and their levels of inclusion with regards to displacement-affected communities could support this [56]. Integrating mobile money (also identified by IOM's market dialogues as an opportunity) could improve ››

Barriers to electricity access

convenience for customers and boost revenues for companies supplying households.

The demand amongst households for improved appliances and electricity services (especially televisions, which were desired by around half of households, and refrigerators, radios, and sound systems, which were wanted by around one in six households [56]) is stifled by the unavailability of appliances. Supporting companies to open outlets and distribution centres in or near displacement-affected areas could help address this. Companies would likely need financial incentives, but they could also be supported by UN agencies and NGOs to share experiences and advice on the specific needs of displaced communities.

To support the sustainability of any intervention, repair and maintenance facilities (for both solar products and appliances) should be readily available. Companies could be supported to develop maintenance hubs closer to displacement-affected areas, and community members could be trained to repair broken products. Including only high-quality and certified products in subsidy and RBF programmes could help increase their longevity.

Finally, household decision-making can affect whether electricity products are acquired and who is able to use them. NGOs could offer community engagement events to highlight the benefits of electricity access and identify the needs of different groups. They could then share their findings with product suppliers to help develop financing schemes, marketing approaches, or other strategies to best accommodate the diverse members of the community.

BARRIER	OPPORTUNITY
Low ability to pay and lack of access to financial services, such as loans and savings groups	Introduce subsidised solar products, PayGo, and results-based financing to build energy markets Work with financial organisations, communities, and NGOs to offer savings cooperatives and loans
Unavailability of solar products in displacement settings and lack of repair services	Support companies to open outlets and maintenance hubs in displacement-affected areas Train local technicians to maintain solar products
Gender dynamics and household decision-making	Implement community awareness-raising sessions to promote clean energy products

Clean cooking for households

The IOM DTM MSLA conducted in Cabo Delgado and Nampula in 2021 found that communities most commonly used charcoal as their primary cooking fuel in 16 out of the 26 locations (62%) with the remainder relying on wood (38%) [52]. These proportions were almost the same across both relocation sites and temporary centres. In all locations, people individually collected wood for cooking, and three-stone or open fires were the most commonly used cookstove.

The five resettlement sites assessed in Sofala in 2022 predominantly used firewood (86%) for cooking, with some using charcoal (14%, and 12% using it as a secondary source) [55]. One site had small-scale charcoal production whilst others bought it from elsewhere, more commonly using it during the rainy season to cook indoors. Most households (63%) had no expenditure on fuel, while small proportions spent up to 400 MZN ($6.35, 12%), 401-800 MZN ($6.35-12.70, 5%) or more (15%). Households that collected cooking fuel from the local area reported animal attacks, criminality, and gender-based violence as safety concerns in several sites, whereas in others, smoke from firewood causing health issues (such as eye pain, coughing, and headaches) was of greater concern (see Table 11).

Most households in these sites used three stone fires while some used locally-fabricated metal stoves, costing around 120 MZN ($1.90), and cooking was typically done in a separate building [55]. Around half of households (45%) reported they would be willing to pay for a metal ICS, with an average maximum acceptable price of 418 MZN ($6.63), and 35% said they would be willing to pay for an electric stove, up to an average of 1,838 MZN ($29).

In the six sites analysed by IOM in Sofala and Manica in 2023, almost all households in all sites used firewood (94-100%) and three stone fires (92-99%) for cooking [56]. The use of firewood was attributed to its free availability from nearby forests, which reduced costs and was convenient for households, although a small percentage (0-3%) used charcoal or agricultural waste. Households reported that their main concerns with current cooking fuels were excessive smoke from cooking indoors (with the exception of one location, where most households cooked outdoors), the risk of fire, and the fragility of cookstoves. Respondents reported that they would be willing to pay for an improved cookstove, typically up to around 600 MZN ($9.50), and most preferred to pay cash upfront or over a six-month instalment plan. Among the options offered, metal stoves

TABLE 11

Safety and health concerns associated with the collection or use of cooking fuels in five sites in Sofala [55].

SITE	MACHONJOVA	METUCHIRA	MUDA NUNES	NDEDJA 1	SAVANE
ANIMAL ATTACKS	73%	27%	64%	31%	53%
BANDITS OR CRIMINALS	7%	6%	18%	4%	24%
SMOKE FROM FIREWOOD	7%	64%	18%	50%	41%
GENDER-BASED VIOLENCE	7%	3%	0%	4%	6%

Clean cooking for households

were preferred by most households (37%), followed by unfired clay stoves (28%).

The IOM DTM MSLA released in August 2024 provides a province-wide overview the coping strategies used in response to a lack of fuel [53, 54].

Displaced people rely on a wide range of coping strategies that vary between regions but commonly include spending savings, gathering firewood from the local environment, and reducing food portions (see Table 12). These can have negative effects on households' wellbeing and safety. ››

TABLE 12

Coping strategies used in a response to a lack of cooking fuel and the percentage of sites in each province where these are reported [53, 54]. Percentages were not reported in Inhambane (two sites) and Gaza (one site).

REGION	PROVINCE	COPING STRATEGIES (% OF SITES)
NORTHERN	CABO DELGADO	*Spending savings (39%), using neighbours' stoves (36%), reducing food portions (27%), begging (20%)*
	NAMPULA	*Spending savings (100%), selling household assets (50%), selling productive assets (50%)*
	NIASSA	*Spending savings (43%), reducing food portions (29%), reducing non-food expenses (29%), no strategy (29%), illegal or risky work (29%), only feed some household members (29%)*
CENTRAL AND SOUTHERN	SOFALA	*No strategy (26%), spending savings (21%), collecting firewood (18%), reducing food portions (16%), reducing non-food expenses (16%)*
	MANICA	*Spending savings (47%), gathering fuel (47%), using neighbours' stoves (47%), reducing NFI expenses (42%)*
	ZAMBEZIA	*Collecting firewood (67%), reducing food portions (33%*
	TETE	*Spending savings (50%), reducing food portions (50%), reducing non-food expenses (25%), collecting firewood (25%)*
	INHAMBANE	*Collecting firewood or purchasing fuel from the local market*
	GAZA	*Purchasing fuel from the local community or using savings*

Barriers to clean cooking

The affordability of improved cooking solutions is one of the biggest barriers to transitioning to clean cooking. READS workshop participants highlighted how a lack of financial resources, due to unemployment or low-income work, limits the uptake of improved cooking solutions when most households presently rely on fuel collected from the local area and basic self-constructed stoves. The high costs of stoves and the lack of financial services further compound these economic barriers. Furthermore, a lack of local repair services and spare parts limits the willingness of households to invest in improved stoves.

The study of five sites in Sofala found that there is limited knowledge amongst IDPs of the financial benefits of switching to clean cooking solutions, despite improved stoves being available in some local markets [55]. Workshop participants reiterated the limited awareness of the positive aspects of clean cookstoves, both financial and health-related, and emphasised that traditional cooking methods were deeply embedded in community practices. They also highlighted that people with additional vulnerabilities, such as elderly or disabled people, are often not effectively included in clean cooking programmes.

OPPORTUNITIES

The study of five sites in Sofala found that around half of households (48%) would be willing to pay the entire cost upfront for their preferred improved cookstove (selected from a suite of options), with others willing to pay over six months (33%), one year (13%) or two years (6%) [55]. On average, respondents were willing to pay around 500 MZN ($8) for improved stoves made from metal, around 1,500 MZN ($24) for wood pellet stoves or stoves fuelled by kerosene or ethanol, or around 3,650 MZN ($58) for an LPG stove.

Despite this willingness to pay, ensuring that community members can afford improved stoves remains a critical issue. Introducing subsidisation for improved stoves, such as through RBF schemes, could decrease costs for customers and allow the involvement of several ››

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Barriers to clean cooking

companies to provide consumer choice and market competition. This could build on the work of the BRILHO programme, which introduced RBF schemes for clean cooking projects around Mozambique [46], and over time these could be reassessed and phased out if appropriate. Additional financial support for people with specific vulnerabilities could help increase clean cooking access amongst these groups. Companies could also be incentivised to establish local stove manufacturing centres and accessible maintenance facilities.

This could be supported by working with microfinance organisations and developing community savings groups to offer long-term financing or loans for cookstoves. These organisations and cooperatives could help community members save for stoves, including more expensive options, and continuing payments even after purchasing one could offer long-term security if the stove were to break.

Emphasising the benefits of clean cooking (such as gender equity, environmental sustainability, health, and entrepreneurship opportunities) and training people to use improved stoves could form the focus of awareness-raising events and community engagement [55]. READS workshop participants shared that households in urban areas, which are generally wealthier and where clean cooking is more common, also appreciated the increased cleanliness of kitchen equipment and the home after making the transition.

Exploring alternative cooking solutions could also help to increase clean cooking in displacement settings. IOM studies found that 3% of households desired electric cookstoves [56], whilst households were also willing to pay for LPG stoves [55]. Pilot schemes to introduce these technologies where viable (such as settlements which have access to the national grid, or those close to LPG distribution points) could explore pathways to cleaner cooking solutions.

BARRIER	OPPORTUNITY
Affordability of clean cooking stoves and fuels compared to free alternatives	Promote subsidised clean cooking solutions through results-based financing
Unavailability of financial services and savings groups	Support community savings cooperatives and loans for cookstoves
Lack of knowledge on the financial and health benefits of clean cooking	Undertake sensitisation and awareness raising activities to promote the importance of clean cooking and the potential savings. Explore alternative clean technologies, such as electric cooking, where possible

Energy access for livelihoods and productive uses

The IOM study on five resettlement sites assessed in Sofala in 2022 assessed energy use amongst businesses and for productive uses of energy (PUE) [55]. Whilst most livelihoods activities were focused on agriculture, small amounts of electricity were used in shops in the main marketplaces or in people's homes. Some entrepreneurs sold chilled drinks using ice packs and some shops offered phone charging using standalone solar panels, which sometimes also charged lights or small devices such as hair clippers. Other businesses relied on phone flashlights or battery-powered lanterns, spending around 10-90 MZN ($0.16-1.43) per week on batteries. The study also found that 98% of farmers relied on rain for irrigation, and in one site (Machonjova), a milling machine was powered by a diesel generator.

The most desired appliance for PUE was refrigerators and freezers (the top choice for 49% of businesses) with other popular choices being ››

TABLE 13

Aspirational PUE appliances in six sites in Sofala and Manica as a percentage of the total responses [56].

SITE	BEGAJA	BOPIRA	MAXEMEDJE	MUCINEMUE	METXISO	MUCOMBE	MEAN
FREEZER	*41%*	*57%*	*12%*	*29%*	*40%*	*44%*	***37%***
AGRICULTURE EQUIPMENT	*1%*	*4%*	*38%*	*24%*	*0%*	*0%*	***11.3%***
CARPENTRY MACHINERY	*7%*	*8%*	*4%*	*11%*	*3%*	*8%*	***6.3%***
AUDIO VISUAL EQUIPMENT	*4%*	*4%*	*5%*	*0%*	*5%*	*3%*	***3.6%***
BARBER SHOP	*4%*	*5%*	*3%*	*4%*	*4%*	*0%*	***3.2%***
LIGHTING	*0%*	*1%*	*3%*	*1%*	*9%*	*2%*	***2.8%***
CELL PHONE CHARGING	*1%*	*0%*	*3%*	*1%*	*5%*	*2%*	***2.1%***
MILLING MACHINE	*0%*	*1%*	*5%*	*0%*	*0%*	*2%*	***1.5%***
CLOTHING SERVICE	*3%*	*0%*	*0%*	*0%*	*0%*	*3%*	***1.1%***
COOKING EQUIPMENT	*0%*	*0%*	*0%*	*1%*	*0%*	*1%*	***0.4%***
BRICK MAKING	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	***0.2%***
NONE	*38%*	*18%*	*28%*	*28%*	*35%*	*32%*	***30.0%***

Energy access for livelihoods and productive uses

sound systems and televisions (especially amongst bars), phone charging, and cooking appliances [55]. When asked what livelihoods they would engage in if they had better access to electricity, 34% said they would open a grocery shop, 10% would start a barbershop or salon, and 3% would use irrigation. Focus groups on PUE found that having a shop with lighting and a refrigerator was the top priority for both men and women; having a cinema was the second priority for men, whilst for women it was opening a bakery; and both men and women stated that having a barbershop or salon was their third priority.

PUE was also assessed in the six sites analysed by IOM in Sofala and Manica [56]. Most businesses were small stores selling grocery items, but some also offered phone charging and used small solar panels or solar lanterns for lighting. Milling machines for processing crops were powered by diesel generators. The PUE appliances were assessed at the site level (see Table 13) and by gender. Both women and men reported a high interest in freezers (36% and 38% respectively) and similar levels of interest in agricultural equipment (11% and 12%), phone charging (2% each) and lighting (3% each). Other appliances had significant gender disparities, including carpentry machinery (1% for women and 14% for men), haircutting equipment (1% and 6%) and having no desire for any productive use appliance (39% and 18%). ››

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Barriers to energy for livelihoods and productive uses

Affordability is a major barrier to increasing PUE. In the five resettlement sites in Sofala, the amount that respondents were willing to pay for a solar kit with a refrigerator was found to be 16 times lower than the market price for such systems [55]. Respondents were willing to invest in economic activities including grocery stores (around 6,800 MZN, $108), refrigeration (7,200 MZN, $114), barbershops and salons (4,000 MZN, $63), agricultural processing (21,000 MZN, $333) and irrigation (6,600 MZN, $105), but at amounts far below their market cost.

The 2022 study in Sofala also identified other barriers for businesses accessing electricity [55]. Access to finance was found to be very limited and only a few were involved in savings groups through which they could access loans. The 2023 study in Sofala and Manica found that high fuel costs and a lack of capital to invest in expansion were two of the biggest issues facing businesses [56]. The study reported that only 20% of businesses had access to any form of financial services such as savings groups, bank loans, or informal loans from the community. Cash remains the most common mode of exchange for goods, followed by mobile money.

IDP households' agricultural land is sometimes far from their resettlement area and involves long journeys to access it, which limits the types of PUE appliances that they would be able to use. As a result, heavy appliances or those which cannot be secured would risk being stolen or damaged when their users are not nearby.

Finally, PUE appliances were not available at the five resettlement sites, forcing people to travel up to six hours to buy new devices [55]. This affects both the initial purchase of appliances and access to repair and maintenance services in case of problems. Other issues not related to energy were also mentioned, such as a lack of time and transportation for goods. ››

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Barriers to energy for livelihoods and productive uses

OPPORTUNITIES

PUE is limited by both the high costs of appliances and the lack of financial services that could make them affordable over longer periods. Introducing financing opportunities for businesses (either through microfinance institutions or the companies selling energy products and appliances) could increase the affordability of PUE and boost incomes to support repayments.

Owning agriculture equipment, such as for irrigation and processing crops, was found to be a popular aspiration in some resettlement sites, but such machinery is typically much more expensive. Forming cooperatives to own, operate, and oversee the use of solar-powered processing machinery could offer a more affordable route to such businesses while also providing an important service to smallholder farmers in the community. The high upfront costs would likely need to be covered by a donor or long-term loan, which could be repaid over time under terms that accommodate income variations between agricultural seasons.

IOM's market dialogues identified that building local technical capacity for the O&M of electricity systems could provide employment [57]. This could also reduce the reliance on support from outside the area or overseas. The dialogues also highlighted that new PUE appliances, supplied by the private sector, could help diversify livelihoods activities. Supporting companies to enter new markets could help increase the range of PUE appliances available in displacement settings – especially those which are portable or lockable – and could be complemented by community engagement and education events.

BARRIER	OPPORTUNITY
Limited access to finance for PUE	Introduce long-term financing for PUE appliances and systems
High costs of high-impact machinery, such as for agricultural processing	Form local cooperatives to own and operate machinery that can benefit many in the community
Unavailability of PUE appliances in displacement settings	Introduce new PUE appliances to the market through company introductions and sensitisation
Agricultural plots are far from resettlement areas, requiring long travel	Select PUE appliance that are portable, lockable and lightweight

Energy access for community facilities and humanitarian operations

The displacement of large numbers of people puts new pressure on infrastructure. The 2021 study on the socio-economic conditions of IDPs in northern Cabo Delgado found that new boreholes had been drilled to provide water, almost all of which used hand pumps [59]. In some cases, this represented an improvement compared to the conditions that IDPs had left, as some had previously relied on unsafe sources such as unprotected wells or rivers. However, in other locations, the supply of water was severely limited and sold at inflated prices.

Across the 26 locations in Cabo Delgado and Nampula assessed by IOM in 2021, 77% had no public areas that were illuminated for at least four hours per night, whilst others had around one quarter (15%), half (4%), or three quarters (4%) of the sites lit for at least that period [52]. Hand pumps were used in 50% of locations to pump water, whilst some used solar panels (19%), the national grid (8%), diesel generators (8%), or other sources. There was no lighting in and around latrines in 62% of sites, though some had solar streetlights (19%) and residents in others used mobile phone torches (11%) or solar lanterns (8%).

The IOM study of five sites in Sofala reported that only one site, Ndedja, had a health centre, which was equipped with a solar system capable of providing four hours of electricity after dark [55]. Savane, meanwhile, had a solar system that powered a UNDP-built market centre, but it had not been operational since Cyclone Eloise destroyed it in 2021. All sites had manual or solar water pumps; the solar pumps did not have battery storage, so water had to be collected during the day. Respondents also preferred to use manual pumps in daylight hours due to the lack of streetlighting and fear of attacks.

Focus groups conducted as part of the assessment asked participants about their top priorities for energy at the community scale [55]. Women prioritised energy for schools, followed by water and the marketplace; men prioritised street lighting, followed by water and schools. Across all sites, 84% of survey respondents reported that streetlighting (or the lack thereof) affected how safe they felt when walking after dark.

Access to potable water was the most urgent need cross the six sites analysed by IOM in Sofala and Manica [56]. Beyond this, the second and third priorities were improved sanitation, community centres, primary schools, and health centres. All sites had access to water pumps, though not all water points were functional. None of the primary schools in the resettlement sites had access to electricity and children had to walk long distances to reach secondary schools located far from the sites. Similarly, no site had a health centre; patients had to travel around 8 km in Manica or more than 30 km in Sofala. Two sites had community centres, neither of which had electricity. All had a small number of streetlights (four or five per site) at key locations, such as water points, but these reportedly did not meet community needs and women shared that they were afraid to walk at night. ››

Barriers to energy for community facilities

The high costs of electricity systems and public lighting, combined with the limited funding available from both government and other sources, make new or replacement systems difficult to implement. Meanwhile, the very limited number of solar systems that exist for schools, community centres, health posts, and marketplaces either provide only a few hours of service or are in disrepair. The limited availability of technical expertise to fix faults further constrains the longevity of the systems that have been implemented.

Infrastructure challenges further inhibit sustainable energy for community facilities. READS workshop participants reported that many communities are in remote areas and far from the national electricity network, making grid connections impossible. Some schools do not have roofs, or classes take place outside, limiting the types of electricity services that could be provided.

Participants also highlighted that the lack of funding for ongoing O&M or replacement equipment, giving an example from Gaza province where solar systems became non-functional because no one was able to maintain them and the batteries failed. Both the lack of technical expertise and the absence of earmarked funds for spare parts, especially batteries, mean that entire systems become non-operational despite relatively straightforward solutions. Finally, workshop participants noted the lack of involvement from the private sector.

OPPORTUNITIES

Increasing the financial resources available for community facility electrification will be essential to scaling up sustainable energy access. Mobilising additional funding would support the installation of more renewable energy systems for schools and health centres and could be combined with other infrastructure improvements, such as building rehabilitation. As FUNAE intervenes in communities ››

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Barriers to energy for community facilities

located more than 30 km away from the national grid, standalone solar and battery systems should be prioritised to provide electricity access; both standalone systems and grid connections should be considered for infrastructure closer to the network. Detailed assessments and surveys, potentially supported by IOM's MSLA, would greatly enhance these efforts.

Working with the private sector could help to implement more projects. Public-private partnerships could unlock new financial models, for example longer-term financing for systems, and combine the expertise of companies with the experience of government, humanitarian, and development organisations. Such partnerships could also support long-term maintenance contracts and equipment replacement to ensure systems remain operational.

Community members should be involved in both the initial phases of system design and ongoing maintenance of systems through training and capacity building. They should also play an instrumental role in improving public lighting: consultations could identify priority areas for lighting, and community groups could oversee lights to ensure they remain operational and undamaged. Improved street lighting would require a large upfront investment, likely from an external donor, but maintenance funds could be collected from local businesses, especially if the lighting improves safety and footfall in in marketplaces after dark.

BARRIER	OPPORTUNITY
High costs of electricity systems and limited funding	Mobilise greater funding through public-private partnerships
Lack of funds for maintenance and replacement equipment	Use long-term maintenance agreements with the private sector and local businesses, engage with local government, and train community members to repair and maintain systems
High cost of public lighting and potential for damage	Establish streetlight cooperatives and explore opportunities for long-term maintenance funding from local businesses

05

Stakeholders and energy projects

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Overview of stakeholders in Mozambique

The humanitarian response in Mozambique is delivered through a network of stakeholders, each with their own mandates, projects, and objectives. Some organisations operate across the country or internationally, whilst others focus on issues in specific displacement settings.

The stakeholders working in Mozambique can be classified into broad categories:

- **Government agencies** with mandates and responsibilities defined by the Government of Mozambique.
- **Humanitarian and development organisations** which typically address specific issues including UN agencies operating across the world, international NGOs with projects in Mozambique, and local NGOs working across the country or in certain areas.
- **Community-led organisations** which are directed and managed by members of the displaced or host communities, as well as appointed community representatives.
- **Private sector** companies which offer energy products or services on a commercial basis.
- **Finance institutions** which offer access to banking and other financial services to community members.
- **Other organisations** with a focus on issues that are related to energy in displacement settings.

This section provides a short summary of the most relevant organisations working in displacement settings in Mozambique, their work, and relevant partnerships. The directory of stakeholders included in this section intends to be extensive but not exhaustive.

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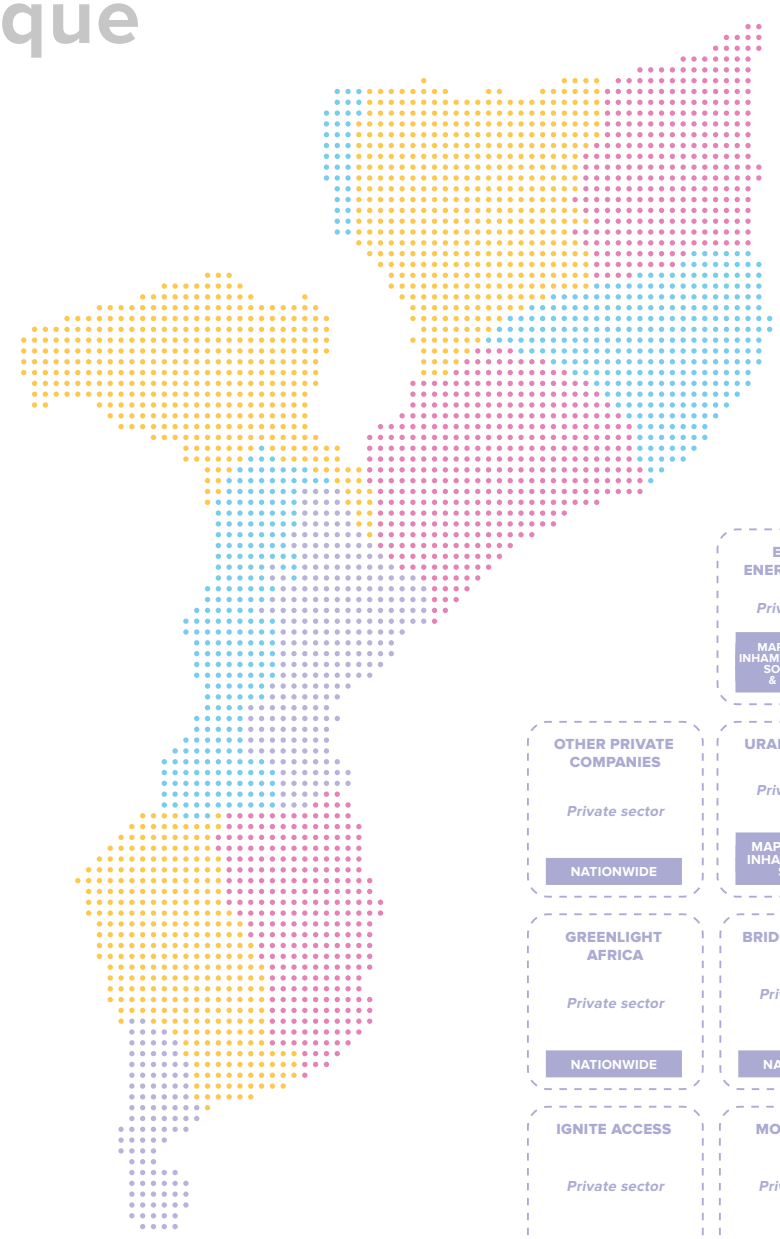
Overview of stakeholders in Mozambique



MINISTRO DOS RECURSOS MINERAIS E ENERGIA
Government
NATIONWIDE

ELECTRICIDADE DE MOÇAMBIQUE
Government
NATIONWIDE

AUTORIDADE REGULADORA DE ENERGIA
Government
NATIONWIDE

MINISTERIO DA AGRICULTURA, AMBIENTE E PESCAS
Government
NATIONWIDE

FUNDO DE ENERGIA
Government
NATIONWIDE

WFP
UN agency
NATIONWIDE

INSTITUTO NACIONAL DE GESTÃO E REDUÇÃO DO RISCO DE DESASTRES
Government
NATIONWIDE

FAO
UN agency
NATIONWIDE

UNICEF
UN agency
NATIONWIDE

GIZ
Development agency
NATIONWIDE

UNOPS
UN agency
NATIONWIDE

ENABEL
Development agency
NATIONWIDE

KULIMA
NGO
NATIONWIDE

ENDEV
International organisation
NATIONWIDE

SNV
Development agency
NATIONWIDE

UNHCR
UN agency
NATIONWIDE

AVSI FOUNDATION
NGO
NATIONWIDE

LIVANINGO
NGO
NATIONWIDE

CARE
NGO
CABO DELGADO AND NAMPULA PROVINCES

UNDP
UN agency
NATIONWIDE

IOM
UN agency
NATIONWIDE

EPSILON ENERGIA SOLAR
Private sector
MAPUTO, GAZA, INHAMBANE, MANICA, SOFALA, TETE & ZAMBEZIA

OTHER PRIVATE COMPANIES
Private sector
NATIONWIDE

URANUS SOLAR
Private sector
MAPUTO, GAZA, INHAMBANE AND SOFALA

GREENLIGHT AFRICA
Private sector
NATIONWIDE

BRIDGE CARBON
Private sector
NATIONWIDE

IGNITE ACCESS
Private sector
NATIONWIDE

MOZCARBON
Private sector
NATIONWIDE

WORLD BANK
International financial institution
NATIONWIDE

AFRICAN DEVELOPMENT BANK (AFDB)
International financial institution
NATIONWIDE

GET.INVEST MOZAMBIQUE
Financial advisory programme
NATIONWIDE

GIVEDIRECTLY
Nonprofit
NATIONWIDE

Stakeholder directory

GOVERNMENT

MINISTRO DOS RECURSOS MINERAIS E ENERGIA

Government

Ministro dos Recursos Minerais e Energia (Ministry of Mineral Resources and Energy, MIREME) is the main government body responsible for defining and implementing energy policy, regulations and strategic plans in Mozambique. It oversees the development of the electricity sector with a focus on renewable energy, fossil fuels, and mineral resources and promotes universal access to energy. The ministry coordinates with EDM, FUNAE, and ARENE to expand rural electrification, regulate tariffs, and attract private investment in energy sector.

NATIONWIDE

ELECTRICIDADE DE MOÇAMBIQUE

Government

Electricidade de Moçambique (Electricity of Mozambique, EDM) is a vertically integrated state-owned national utility company responsible for electricity generation, transmission, and distribution across Mozambique. It operates the national grid and expands electricity access in the country through large-scale infrastructure projects and grid extension.

NATIONWIDE

FUNDO DE ENERGIA

Government

Fundo de Energia (The Energy Fund, FUNAE) is the national fund for energy, established under MIREME to promote rural electrification and expand access to modern energy services. It is the main government institution responsible for financing and implementing off-gird renewable energy solutions such as solar-home systems, mini-grids, water pumping systems, and clean cooking projects. FUNAE develops projects in remote areas where grid extension by EDM is not viable.

NATIONWIDE

AUTORIDADE REGULADORA DE ENERGIA

Government

Autoridade Reguladora de Energia (Energy Regulatory Authority, ARENE) is the national energy regulatory authority responsible for overseeing the electricity, natural gas, and liquid fuel sectors. It regulates these sectors by licensing operators, approving tariffs, monitoring service quality, and ensuring fair competition in the market. Its mandate includes ensuring compliance with laws, regulations, and standards; conducting evaluations and publishing reports on quality of energy services; and representing the country in international fora.

NATIONWIDE

Stakeholder directory

GOVERNMENT

INSTITUTO NACIONAL DE GESTÃO E REDUÇÃO DO RISCO DE DESASTRES

Government

Instituto Nacional de Gestão e Redução do Risco de Desastres (National Institute for Disaster Risk Management and Reduction, INGD) is the government agency responsible for disaster risk management at national, district, and community levels. Its mandate includes leading and coordinating actions for disaster prevention and mitigation, managing emergency response, and overseeing post-disaster reconstruction efforts. INGD also manages early warning systems, public awareness and community mobilisation activities, and mapping of disaster-prone zones.

NATIONWIDE

MINISTERIO DA AGRICULTURA, AMBIENTE E PESCAS

Government

Ministerio da Agricultura, Ambiente e Pescas (Ministry of Agriculture, Environment, and Fisheries, MAAP) plans, directs, monitors, and implements policies in the areas of agriculture, livestock, agroforestry, food security, fisheries, and land administration. It also oversees resettlement projects and the provision of land for farming for displaced communities.

NATIONWIDE

Stakeholder directory

HUMANITARIAN AND DEVELOPMENT

IOM

UN agency

The International Organization for Migration (IOM) has been providing technical support the Government of Mozambique since 1994. Following the country's accreditation in 2005 its membership in IOM in 2011, the organisation has operated through offices in Maputo, Beira, Pemba and Nampula field office to deliver migration, humanitarian, and recovery support. Its programming covers a broad range of activities such as health, protection and assistance for vulnerable migrants, camp coordination and management, shelter, non-food items, mental health and psychosocial support, water, sanitation and hygiene (WASH), and emergency responses to disasters and conflict. IOM is also a leading actor in displacement data collection through the Displacement Tracking Matrix (DTM), which informs needs assessments, monitors flows of IDPs and returnees, and supports evidence-based planning. In recent years, IOM has collaborated with the private sector, local communities, and other partners to pilot and scale energy initiatives such as cooking solutions and solar systems in displacement and resettlement sites to promote household energy access and productive uses of energy.

NATIONWIDE

UNHCR

UN agency

The Office of the United Nations High Commissioner for Refugees (UNHCR) provides protection and assistance to refugees, asylum-seekers, IDPs, IDP returnees, and stateless persons in Mozambique. The agency's presence intensified in 2017 due to escalating violence in northern provinces, particularly in Cabo Delgado which led to large-scale displacement. UNHCR's programming includes protection services, shelter and non-food item distribution, WASH, education, and livelihoods support. The agency also leads the Protection Cluster in northern and central Mozambique and coordinates efforts among humanitarian actors to ensure a cohesive response to displacement. In recent years, UNHCR has collaborated with development partners and the Government of Mozambique to enhance energy access for displaced populations. Notably, the agency has partnered with the African Development Bank (AfDB), the World Bank, and the Government of Mozambique to extend the "Energy for All" project in Nampula province to include refugees and IDPs, providing electricity to households and small enterprises in settlements.

NATIONWIDE

UNDP

UN agency

The United Nations Development Programme (UNDP) has been working in Mozambique since 1976 by supporting the country to become more resilient to create and sustain growth and improve people's lives. UNDP's Stabilization Project aims to support the Government of Mozambique in reclaimed areas and prepare for reconstruction and subsequent safe and voluntary returns of IDPs to their areas of origin. UNDP promoted livelihoods and employment in Cabo Delgado by providing bicycles, cell phones, and solar panels for communities to charge electronic devices.

NATIONWIDE

Stakeholder directory

HUMANITARIAN AND DEVELOPMENT

FAO

UN agency

Working in Mozambique since 1979, the Food and Agriculture Organization of the United Nations (FAO) focuses on boosting nutrition and food security while improving livelihoods by addressing challenges in the agriculture, livestock, forestry, fisheries, and aquaculture sectors. FAO is working in Mocimboa da Praia, Palma, Chiure, Balama, Mecufi, Memba, Metuge, and Montepuez districts to strengthen livelihoods and food security for returnees, IDPs, and host communities. FAO has implemented an agricultural support programme and provided host communities and IDPS with winter season agricultural kits including seeds and tools for vegetable production in all nine districts of Cabo Delgado and three districts of Nampula province.

NATIONWIDE

WFP

UN agency

The World Food Programme (WFP) provides food assistance and nutrition support to vulnerable populations in Mozambique. In 2024, WFP assisted over 2.1 million people across the country with a focus on connecting emergency assistance to early recovery and resilience-building efforts. WFP provides kind and/or cash-based transfers, especially in Cabo Delgado. WFP supported the Government of Mozambique through the Durable Solutions and Refugee Call to Action initiatives by helping draft an action plan for managing IDPs, promoting refugee self-reliance via dam rehabilitation and agricultural development, and providing food assistance to 8,000 people in Maratane refugee camp in 2024. As part of the UN Joint Response Plan in Cabo Delgado, WFP, UNICEF, and IOM provided emergency kits with food, shelter, water, and health supplies to 6,300 newly displaced people in Chiure district, addressing their immediate humanitarian needs.

NATIONWIDE

UNICEF

UN agency

Since opening its first office in Mozambique in 1975, the United Nations Children's Fund (UNICEF) has been collaborating with the Government of Mozambique to protect children, especially those affected by humanitarian crises, emergencies, and displacement. UNICEF has worked with AVSI to address undernutrition among IDPs and host communities by training women on enhancing family's diets using locally available food instead of fish, which families depended on prior to displacement. The organisation has also partnered with Fundação para o Desenvolvimento da Communidade (FDC) to implement child protection activities in Eduardo Monlane resettlement camp in Mueda, Cabo Delgado province. Additionally, UNICEF has established child-friendly spaces that bring together children from displaced and host communities to ease tensions and foster trust, friendship, and social cohesion.

NATIONWIDE

Stakeholder directory

HUMANITARIAN AND DEVELOPMENT

GIZ

Development agency

Working in Mozambique since 1985, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) has been focusing on three areas: economic development, training and employment; climate and energy; and peaceful and inclusive societies. GIZ has been implementing a project in northern Mozambique to improve the living conditions of IDPs and host communities in Cabo Delgado and Nampula provinces. Between October 2024 and September 2026, the project aims to enhance government capacities for coordinating humanitarian and development efforts, expands access to employment and training opportunities, and promotes social cohesion through conflict prevention initiatives. GIZ, together with the Fundação para o Desenvolvimento da Comunidade (FDC), through the Energising Development (EnDev) and Grüne Bürgerenergie (GBE) programmes set up the Fundo de Acesso Sustentável às Energias Renováveis (FASER, Results-Based Financing Fund for Sustainable Access to Renewable Energy) that uses results-based financing to promote the adoption of renewable energy technologies in the country.

NATIONWIDE

UNOPS

UN agency

The United Nations Office for Project Services (UNOPS) support peace, security, humanitarian and development projects by providing solutions in infrastructure, procurement and project management. In Mozambique, UNOPS supports its partners to achieve SDGs through fund management, infrastructure and procurement services. UNOPS has been supporting the Northern Crisis Recovery Project, funded by the World Bank and led by the Government of Mozambique, which aims to restore essential services and foster social cohesion in crisis affected communities. The project includes activities such as rebuilding schools, health centres, water systems, and market infrastructure, while supporting livelihood opportunities and local governance. It also focuses on enhancing disaster resilience and promoting inclusive participation of displaced and host communities in recovery planning.

NATIONWIDE

ENDEV

International organisation

Energising Development (EnDev) has activities in Mozambique including supporting households with grid connections, developing the private sector for solar product distribution, and strengthening the local market for improved cookstoves. EnDev also supports the government on establishing a national energy access monitoring platform. EnDev has provided RBF to companies in the off-grid and clean cooking sectors through the FASER fund. More recently, EnDev has signed a grant agreement with IOM to support new market entrants piloting mesh grids in displacement settings.

NATIONWIDE

Stakeholder directory

HUMANITARIAN AND DEVELOPMENT

SNV

Development agency

Netherlands Development Organisation (SNV) has been active in Mozambique since 1995, working on areas such as agri-food systems, water, and energy. SNV is implementing the BRILHO programme (2019-2026) funded by FCDO and Swedish International Development Cooperation Agency (Sida), which aims to expand access to quality SHS, mini-grids and clean cooking solutions in underserved rural areas while also supporting the Government of Mozambique to strengthen the regulatory framework for the off-grid energy sector. SNV has launched the +SOL Mini-Grid Facility (2024-2028), funded by Sweden and implemented in collaboration with FUNAE and ARENE, to incentivise private sector investment in sustainable mini-grids.

NATIONWIDE

ENABEL

Development agency

Enabel is a Belgian agency for international cooperation that has been active in Mozambique for more than 20 years focusing on climate change impacts and sustainable development in alignment with the National Development Strategy. Enabel focuses on climate finance, just energy transition, sustainable access to drinking water, disaster risk reduction and management, and waste management and circular economy in the country while adapting a human-rights based approach to reduce inequalities and vulnerabilities of certain groups including displaced communities, refugees and elderly.

NATIONWIDE

AVSI FOUNDATION

NGO

AVSI Foundation is an international NGO that has worked in Mozambique since 2010. It is active in four provinces with programmes spanning urban development, food security and agriculture, education, energy and environment, and emergency response. AVSI promotes access to energy-efficient cookstoves and livelihoods opportunities across the energy value chain. In Cabo Delgado, AVSI works in IDP centres to improve access to renewable energy and water, and support economic resilience using vocational training and PUE.

NATIONWIDE

LIVANINGO

NGO

Founded in 1998 and formally registered in 2001, Livaningo is a Mozambican non-profit organisation that works on environmental protection, social justice, and community well-being. Its activities include distributing solar lamps, promotion improved cookstoves, and supporting communities with clean and reliable energy solutions. Livaningo partners with UNHCR in the Maratane refugee settlement to strengthen private sector engagement and market inclusion for refugees, asylum seekers, and host communities. It also works in Cabo Delgado to support vulnerable groups, including IDPs, through economic empowerment and savings and credit initiatives.

NATIONWIDE

Stakeholder directory

HUMANITARIAN AND DEVELOPMENT

KULIMA

NGO

KULIMA is a Mozambican NGO founded in 1984, initially to support refugees during the civil war. Today, it focuses on rural development, clean energy, and community resilience. KULIMA promotes clean cookstoves to reduce health and environmental risks and empower women through training and local production. In displacement contexts, KULIMA implemented improved cookstoves projects that targeted both displaced and host communities.

NATIONWIDE

CARE

NGO

CARE is an international organisation addressing crisis, food and water, health, education and skills, and climate issues in Mozambique since 1984. In Cabo Delgado and Nampula provinces, CARE supports IDPs and host communities through Village Savings and Loan Associations (VSLAs) to support women to access credit and establish income-generating businesses in face of drought and insecurity.

CABO DELGADO AND NAMPULA

Stakeholder directory

PRIVATE SECTOR

EPSILON ENERGIA SOLAR

Private sector

Founded in 2018, Epsilon Energia Solar is a Mozambican company aiming to transform energy access in rural communities by offering affordable off-grid and on-grid solutions. The company offers a wide range of products such as SHS, solar water pumps, cold room storage, and turnkey larger systems. Epsilon Energia Solar is part of the consortium for IOM's initiative on Environmental Sustainability in Sofala province.

MAPUTO, GAZA, INHAMBANE, MANICA, SOFALA, TETE AND ZAMBEZIA

URANUS SOLAR

Private sector

Uranus Solar is a Mozambican company distributing and installing SHS in rural and peri-urban areas while using PAYGO models to ensure financial inclusion.

MAPUTO, GAZA, INHAMBANE AND SOFALA

BRIDGE CARBON

Private sector

Bridge Carbon is a carbon project developer through nature-based solutions, cookstove projects, and methane avoidance in Sub-Saharan Africa and South-East Asia.

NATIONWIDE

IGNITE ACCESS

Private sector

ENGIE Energy Access was acquired by Ignite Power to form Ignite Energy Access in 2025. Ignite Energy Access plans to expand across 14 African countries and reach more than 15 million people with renewable energy solutions.

NATIONWIDE

MOZCARBON

Private sector

Mozambique Carbon Initiatives Lda. (MozCarbon) is a privately owned company aiming to decrease greenhouse gas emissions and promote sustainable development through clean technology solutions. MozCarbon implements projects on clean cooking technologies, solar systems, and forestry projects.

NATIONWIDE

GREENLIGHT AFRICA

Private sector

GreenLight Africa is a Mozambican based consulting and project development firm focusing on energy and environment in the region. It also operates across Southern and East Africa.

NATIONWIDE

Stakeholder directory

FINANCIAL INSTITUTIONS

WORLD BANK

International financial institution

The World Bank is an international financial institution that provides loans, grants, and technical assistance to countries aiming to support economic development and reduce poverty. In Mozambique, World Bank supports ProEnergia project, which contributes to country's National Energy for All Program (Programa Nacional de Energia para Todos). The project connected more than half a million homes, streets, schools, and health posts across the country. ProEnergia project has also provided 10 resettlement areas for IDPs with electricity, which boosted business opportunities.

NATIONWIDE

AFRICAN DEVELOPMENT BANK (AFDB)

International financial institution

African Development Bank (AfDB) is a multilateral development finance institution to promote economic growth across Africa. Through the Mozambique Energy for ALL (MEFA) project, AfDB has collaborated with the government and other partners to expand electricity access to underserved communities. UNHCR, in partnership with AfDB, the World Bank, and the Government of Mozambique, has provided electricity to refugees and IDPs in Nampula province as part of the MEFA project. In addition, AfDB approved a $17 million grant for the Resilient Investment for Socio-Economic Empowerment, Peace, and Security (RISE-PS) project, aiming to rebuild conflict-affected regions, enhance energy infrastructure, and support displaced communities in the region.

NATIONWIDE

GET.INVEST MOZAMBIQUE

Financial advisory programme

Established in 2019, GET.invest Mozambique is a European Union and Germany-funded initiative implemented by GIZ to mobilise private investment in renewable energy projects. GET.invest has unlocked more than €9 billion in investments in line with Mozambique's Energy Transition Strategy.

NATIONWIDE

GIVEDIRECTLY

Nonprofit

GiveDirectly is a nonprofit organisation which lets donors send money directly to projects around the world. It has supported projects in Mozambique including for emergency relief, resilient agriculture and livelihoods, climate-smart agriculture, and youth programmes. It has reached an estimated 23,000 people and delivered more than $13 million.

NATIONWIDE

IOM Mozambique: Supporting energy markets in displacement settings

Initial work on energy access

Since 2021, IOM Mozambique has regularly collected data on the energy needs and priorities, and vulnerabilities of communities affected by conflict and climate shocks. In protracted displacement situations in the Central region, access to energy was reported as one of the most urgent needs, with more than 90% of IDPs reliant on traditional fuels such as biomass for cooking. Many host communities are in a similar situation: those in rural areas depend mainly on firewood, and those in peri-urban areas mostly use charcoal. This can lead to tensions over scarce natural resources, as well as deforestation which affects local ecosystems.

IOM has provided solar lamps as part of NFI kits, installed public lighting in accommodation centres, and used electricity to provide essential services such as water pumping for communities in need of humanitarian assistance directly after displacement. These solutions are effective in the short term, but having an effective sustainability strategy is important for long-term success. This requires strong collaborations: IOM identified that the most suitable private sector partners are those willing to take on risk, work together, and adapt alongside humanitarian organisations, showing flexibility and openness to learning throughout the project. Additionally, clean energy access initiatives are more likely to succeed in stable locations, such as resettlement sites with long-term prospects and communities where displaced people intend to remain, since these environments provide a stronger foundation for market-based approaches than areas experiencing frequent population movements or instability.

Understanding stakeholders

To explore how to support long-term energy access, IOM launched a first project across seven resettlement sites hosting IDPs in Central Mozambique. First, IOM mapped the existing coverage of energy access-related companies in the region. Building on government and other partners' initiatives to incentivise access to cleaner energy solutions, IOM covered some of the costs to de-risk companies' activities and encourage them to expand into displacement settings.

While the private sector's role in the project initially focused on expanding existing activities rather than innovating or adapting business models, this approach offered important lessons. Experience showed that for long-term private sector engagement beyond the period of external support, it is crucial to prioritise risk sharing and co-design between humanitarian actors and companies. These elements help ensure that private partners remain active and invested once direct support phases out.

Building on these lessons, the next step was to actively co-design solutions with private sector partners.

Under a project funded by Innovation Norway, IOM brought together companies, government representatives, and community members to develop tailored solutions that could meet stakeholder needs. This involved better understanding the priorities of communities, what companies are willing to provide, and the barriers involved in aligning these.

IOM undertook detailed energy needs assessments and held co-design workshops with ››

IOM Mozambique: Supporting energy markets in displacement settings

displaced communities, including an artist to visualise the aspirations from participants, to better understand local priorities. This participatory approach was especially beneficial in areas with very limited access to energy as community members often struggled to express how energy, often an abstract concept compared to its practical and potential applications, could meet their daily needs.

In parallel, IOM conducted market dialogues and bilateral discussions with companies to better understand their positions. IOM launched a call for proposals with four components: developing tailored financial services to improve IDP access to sustainable energy, establishing marketplaces for clean energy solutions in resettlement sites, creating PUE opportunities through training and entrepreneurship, and introducing innovative financing or de-risking mechanisms to encourage private sector engagement in displacement settings. This approach was designed to support flexible, market-based solutions for both household energy access and local economic development.

Implementing projects to address energy priorities

IOM partnered with a carbon project developer which introduced their stoves to community members and invited them to share their first impressions and feedback. Community input was especially important in reviewing practical aspects, such as the materials used for the stove's foundation, to ensure the design met local needs and preferences.

Because access to finance and financial inclusion were identified as key challenges, the company incorporated savings groups into their approach to support broader financial empowerment. This was grounded in the belief that clean and efficient cooking can unlock time, health, and productivity for women and girls, enabling them to participate in opportunities such as village savings and loan associations (VSLAs) and ultimately fostering community development.

The company also introduced nature-based solutions aimed at improving soil fertility and moisture retention, restoring beneficial tree cover in both community and agricultural areas, and promoting intensive agroforestry intercropping. These practices eliminate the need for chemical fertilisers, boost climate resilience, and enable the cultivation of crops that could serve as future sources of fuelwood. The overall goal was to generate evidence for an integrated approach that could attract investment from carbon finance. ››

Communities in some of the most difficult-to-access areas were amongst the most willing to engage with new projects

IOM Mozambique: Supporting energy markets in displacement settings

For the PUE component, IOM worked with two private entities: one solar energy company which sourced appropriate technologies and provided equipment, and one consulting firm which supported the identification of the type of small businesses that could benefit from the access to energy. The latter also managed a subsidy fund for PUE appliances, while Mercy Corps facilitated stakeholder discussions, data analysis, and co-designed the subsidy fund mechanism and governance structure with IOM. Solar-powered freezers and solar water pumping were identified as high-impact opportunities.

Thirty community members were selected to access subsidised prices and adjusted payment plans, and savings groups were found to be critical to help customers afford the PUE appliances. In addition, the consulting firm ran business skills trainings for PUE users and VSLA members to help create further synergies.

Based on the learnings of this project, IOM created a toolkit to facilitate replication by other stakeholders [61]. This approach has been useful for the organisation as it moved into a scale-up phase and expanded to new sites.

Developing opportunities for carbon finance

Government's interest in developing carbon market policies and regulatory frameworks also provided an opportunity to explore the potential of carbon-related revenues as an additional source of funding for energy projects in displacement settings. In line with IOM's Strategic Plan (2024-2028) and Global Appeals to develop high-integrity carbon credits [62], IOM Mozambique investigated how carbon finance could contribute to achieving the country's goals on durable solutions – an area strongly supported by the government – and how affected communities could be involved in the design of such projects.

While communities are the ones generating greenhouse gas emission reductions by improved cookstoves or nature-based solutions, the administration of carbon finance mechanisms typically falls to external project developers. It is therefore essential to ensure that community members fully understand how their climate actions translate into tradable carbon credits, and to obtain their free and informed consent prior to organisations selling the climate mitigation benefits created through these efforts. This transparency helps build trust and ensures that the benefits are shared fairly and ethically. To further support this, in 2025 IOM Mozambique started a collaboration with African Leadership Academy to develop tools to strengthen engagement and to identify the type of benefit-sharing mechanism that fit these communities' aspirations.

Insights on working with stakeholders

IOM has gained valuable experience collaborating with a wide range of stakeholders through its energy access projects. At the community level, the main challenge is usually the level of knowledge about energy access. Iterating different ideas to help people vocalise their thoughts and visualise how having improved access to electricity or cooking solutions might address their current needs is critical. IOM found that communities in some of the most rural and difficult-to- ››

IOM Mozambique: Supporting energy markets in displacement settings

access areas were the most willing to engage and take risks with new projects, and that community members are generally very accountable to one another, which can help projects succeed. The organisation also found it highly beneficial to have the flexibility to iterate, change, and learn by doing when trying to establish how much people are willing to pay for new energy services.

The private sector can offer speed and flexibility compared to other stakeholders, although collaborating with it comes with its own constraints. Many companies are new to working with humanitarian partners and so there must be alignment from the beginning on how to work together effectively. Companies understandably expect to be compensated for their efforts (for example through financial support, clear profits and return on investment, or useful information for future operations) but determining an appropriate level of remuneration in vulnerable contexts can be challenging. Furthermore, involving several companies in projects can prevent monopolies but may create hesitancy around sharing information with potential competitors during market engagement events.

Alignment with Mozambique's national priorities has enabled smooth collaboration with local and provincial authorities. Many of IOM's solutions focused on innovative approaches and energy delivery models rather than new technologies. However IOM's other innovative project, which focused on mesh grids, highlighted some key challenges when introducing emerging technologies. Despite market dialogues and a relatively flexible partnership process, the local private sector entities were hesitant to participate due to the novelty of interlinking solar systems to provide power peer-to-peer compared to a traditional mini-grid. Navigating risk sharing and co-investment proved challenging compared to more traditional service provision models.

Learning from experience

Whilst much more work is necessary to improve access to clean cooking and electricity in displacement settings, the focus is increasingly shifting towards how energy access can support broader priority areas, such as livelihoods. IOM Mozambique's approach has had wider organisational benefits and the project team has discussed its approach with IOM operations in other countries, such as Malawi, to explore replication. Furthermore, the project toolkit developed as part of its energy access work offers a blueprint for other parts of the organisation, as well as supporting scale-up in Mozambique.

Overall, IOM found that undertaking a dedicated contextual analysis, including mapping stakeholders and conducting detailed baseline assessments of energy needs, provided an important foundation for its energy programming. Collaborating with flexible and mission-driven partners as part of innovation projects can help to meet the needs of communities, even in the face of uncertainties, especially regarding the willingness to pay for new energy products and services. Whilst more is still to be learned about how best to leverage carbon finance to support the delivery energy interventions, it is expected to offer a route to increased and long-term financing for clean cooking and could unlock opportunities for companies to establish sustainable operations in displacement settings.

For now, IOM remains committed to strengthening Mozambique's energy market ecosystem and support new and innovative projects across displacement-affected areas.

06

Potential high-impact projects

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Overview of the design process

Effective long-term solutions cannot be implemented in isolation. Close coordination among stakeholders and fostering learning between different organisations is essential to use resources as efficiently as possible and to scale up existing work. Designing potential energy interventions together – bringing together the experience and expertise of many different stakeholders – can help to identify the most impactful areas of programming as well as the potential barriers and enablers that will affect its implementation.

In support of this, the READS workshops featured a session in which groups of diverse participants came together to learn about each other's work and co-design potential high-impact projects, building on the experience made with existing interventions. Each group focused on a different energy issue with the goal of outlining a viable project opportunity that would directly address some of the greatest issues currently faced in displacement contexts in Mozambique.

By involving a range of stakeholders in the collaborative co-design process, and crucially displaced and host community representatives who are integral to any project design, the project concepts aim to address the barriers and gaps that the participants identified as the most pressing. They draw on approaches that have already been piloted that show potential to be either replicated in different settlements or scaled up.

Following these initial designs and augmented with elements of others that were identified as viable project opportunities, these ideas have been further developed into the project concepts presented in this section. These summaries provide an outline of the potential project including:

- The proposed location and scale,
- The project activities and potential implementation partners,
- Enablers and barriers which could affect its realisation,
- How these projects link to previous work through replication and scaling, and
- Ideas for community engagement, gender mainstreaming, and inclusivity.

The estimated costs of the projects are included as a guide and will vary significantly depending on their scale and complexity. The project concepts are designed to be a starting point to further develop interventions, scope out potential partnerships, attract investment, and ultimately increase access to sustainable energy.

The READS workshops featured a co-design session for stakeholders to develop viable, high-impact projects to increase access to sustainable energy for their specific area.

Important considerations for project design

There are considerable differences between settlements for displaced people both across the country and within similar areas, and between displaced and host communities. Variations in the amount of existing infrastructure, levels of economic activity, distances to towns, culture, and local needs and priorities will determine what kinds of interventions would have the greatest effect in increasing access to sustainable energy in each location. In all interventions, efforts must be made to address both the needs of host communities as well as displaced people to not disadvantage one group and to promote social cohesion and peaceful coexistence.

A one-size-fits-all approach will not be able to account for these nuances. Before beginning any of these projects, further research and detailed assessments at the local level will be necessary to better understand the specific and unique situations on the ground. Such assessments should also be independent, objective, and afforded appropriate time and resources to best develop long-term implementation plans. These should be done with stakeholders which best understand their energy needs and are therefore best positioned to shape the proposed interventions.

Many of the project concepts aim to use market-systems to better integrate the private sector in the provision of sustainable energy in displacement contexts. For this to work in the long term, national or international companies should set up operations with supply chains to outlets in displacement-affected areas – and be adequately supported in doing so, where required – to establish a permanent presence which endures after external funding ends. Local companies in these areas, meanwhile, should be supported to conform with national and international product standards to ensure quality for customers. All companies and organisations which implement sustainable energy technologies should facilitate ongoing and independent evaluations to assess their benefits to the user in the field, not just under laboratory or ideal conditions, to monitor their continued usage and long-term benefits. ●

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Community involvement

Displaced and host communities should be involved from the outset when designing sustainable energy interventions as they understand best their own energy needs and priorities. Community members are particularly well-placed project partners owing to their networks and knowledge of the context, and so should have important roles to play in the design and implementation of interventions. Some potential opportunities to involve the community include:

- Working with community groups and a range of leading figures to gather input on design of intervention plans, and to advocate for sustainable solutions with other stakeholders and within their communities,
- Consulting with different community segments during the design phase of interventions and for delivery model development, such as through focus group discussions, co-design workshops and community mapping interventions, whilst coordinating with other organisations to minimise overlap and survey fatigue,
- Hire community members as sales agents, community mobilisers and product ambassadors,
- Equitably target both displaced and host community members for employment and sales targets,
- Providing training and capacity building for community members, such as on the installation or maintenance of energy technologies and customer services, and
- Involving or creating cooperatives to oversee and manage community-wide or public projects and their locations, such as streetlights, and
- Direct collaboration with humanitarian and development actors, the private sector, and other organisations for project planning, management, auditing and other key activities.

Gender mainstreaming

Sustainable energy interventions could have different implications for women and men. This can be exacerbated when decision makers, typically men, are not the same gender as the primary users of energy technologies, for example typically women with regards to domestic responsibilities. Considering these differences and the effects they may have during both the design and implementation of energy projects can allow them to better meet the needs of all community members and promote gender equality. Gender mainstreaming will vary depending on individual contexts and communities but could be integrated into projects by:

- Using single-gender focus groups during initial scoping phases to identify gender-specific concerns, for example around the locations of public lighting,
- Targeting equal opportunities for training and employment for both women and men,
- Increasing opportunities for training and employment for women in roles that are traditionally seen as “men’s work”
- Identifying employment opportunities for women which are compatible with family, childcare or household responsibilities, for example near to their homes,
- Schedule engagement events at convenient times of the day and/or provide stipends to avoid conflicting with childcare responsibilities and allowing mothers to participate,
- Using awareness-raising campaigns for energy solutions that target men and women to promote interest in the new technologies,
- Offer cooking classes in schools to both boys and girls to raise awareness of clean cooking solutions and encourage both boys and girls to learn how to cook, and
- Highlight the needs of different household members during product sensitization campaigns and encourage joint decision-making.

Inclusivity strategies

Achieving sustainable energy for all requires understanding and meeting the needs of every member of the community. In displacement contexts some people may have specific vulnerabilities or require different considerations to access sustainable energy, for example if they have a disability. Including these people in project design, and offering strategies for their inclusion during implementation, can mean that energy interventions meet their needs more effectively. Some inclusivity considerations could include:

- ☑ Holding focus groups with people with specific vulnerabilities to ensure an intervention will be accessible to them and meet their needs,
- ☑ Include people with disabilities in trainings and employment opportunities whilst accommodating any specific needs,
- ☑ Engaging with microfinance companies to develop services which make upfront costs more accessible to low-income customers, such as for connections to mini-grids,
- ☑ Use voucher systems for vulnerable customers to access technologies within a wider market-based approach, such as for solar products or improved cooking solutions, and
- ☑ Promote technologies, products, and designs which accommodate users with specific vulnerabilities or disabilities.

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Project concepts

STANDALONE SOLAR SYSTEMS FOR EDUCATION

1/2

LOCATION

Northern Mozambique (Cabo Delgado, Niassa, Nampula)

BACKGROUND

Over the past several years, communities in the northern region of Mozambique (particularly in Cabo Delgado) have been displaced due to disasters, armed conflict, and violence. As a result, children and adolescents growing up in resettlement sites have faced significant barriers to continuing their education, largely due to the lack of adequate infrastructure and the constant relocation of people and resources.

Solar systems can support key educational needs by providing light for studying after dark, fans for cooling, internet access, and other benefits. These could have the greatest impact for primary and secondary schools in remote areas. Assessing the needs across several communities can help design a small number of system designs (for example for different types of schools) that can be readily deployed in resettlement sites. These should be semi-permanent systems which, if need be, can be moved to new locations or stored safely if extreme weather risks damaging them.

ACTIVITIES

Conduct a comprehensive assessment of electricity needs for schools across six districts in Northern Mozambique

Establish partnerships with key education stakeholders across government, UN, and NGOs

Design two or three categories of solar and battery system sizes that can meet the needs of different types of schools

Procure solar energy systems through a competitive private sector tendering process

Oversee the installation of systems

Provide training for school personnel on daily operation and basic troubleshooting

Develop and implement O&M protocols through service agreements or by engaging trained local technicians

Monitor and evaluate the impact of the solar systems on educational outcomes and learning environments

ENABLERS

High priority to support education in resettlement sites

Supports access to education

Aligns with government and humanitarian priorities

Systems can be taken down and redeployed if necessary

BARRIERS

High upfront costs and need for long-term funding for maintenance and spare parts

Limited local expertise for O&M

Risk of over- or under-sized systems if energy needs are not well defined or change over time

Logistical challenges in remote locations

Project concepts

PROJECT REACH, TIMELINE AND BUDGET

Twenty solar systems
Two years
$600,000

FURTHER INFORMATION

Education in displaced settings is an important priority to give children growing up in these communities the best chance of success. Providing electricity to schools can support learning and also provide associated benefits, such as improved teacher retention and the opportunity to charge devices for use at home.

Energy needs and consumption patterns differ across schools and in different areas of the country. Categorising schools based on needs allows the system design to be simplified and standardised to enable faster implementation. It can, however, come with the risk of oversizing the systems (increasing costs) or undersizing them (decreasing service quality). These trade-offs will need to be accounted for in the system design process.

To support the longevity of the systems, recurring funding would be required for maintenance and spare parts such as replacement batteries. Ensuring that the solar systems are mobile can contribute to the long-term humanitarian response as systems can be redeployed if the community returns home or moves to a new location.

REPLICATION & EXPANSION

Some schools in resettlement sites have solar systems

Possible to expand to other areas of the country

STAKEHOLDERS AND ROLES

NGO to lead programme oversight, facilitate stakeholder engagement, and carry out research, monitoring, and evaluation activities

Schools to manage daily operations of the systems and report any technical issues or malfunctions

Private sector to supply, install, and provide ongoing maintenance of the systems

Government agencies to ensure regulatory compliance and provide legal support for programme implementation

Donors to contribute upfront capital for system procurement and commit to long-term funding for operations, maintenance, and performance monitoring

SCALABILITY

High: Straightforward to expand the reach of the project dependent on available funding.

STANDALONE SOLAR SYSTEMS FOR EDUCATION 2/2

Project concepts

SOLAR LIGHTING FOR MARKETPLACES

1/2

LOCATION

Central Mozambique (Manica, Sofala)

BACKGROUND

Many resettlement sites are not connected to the national electricity grid. As a result marketplaces in these settings, including both camps and host communities, often lack public lighting, which increases safety risks and restricts economic activity after sunset.

Installing standalone solar streetlights in these areas can provide consistent and reliable lighting, improve security, and enable extended business operations, thereby stimulating the local economy. These can be supported through lighting cooperatives which would take responsibility for managing and maintaining the streetlights, with financial contributions from local businesses.

ACTIVITIES

Collaborate with community groups and local leaders to identify high-priority areas for streetlight installation

Form an inclusive and representative committee to oversee the implementation and long-term maintenance of the streetlights

Evaluate the potential for local communities to take on maintenance responsibilities

Partner with a reputable company for the installation of solar-powered streetlights

Provide training for local technicians and committee members in basic streetlight maintenance and troubleshooting

Implement regular maintenance checks and establish a reliable system for repairs and the supply of spare parts

Monitor key indicators, including business operating hours, nighttime safety incidents, and streetlight functionality

ENABLERS

Low access to public lighting

Limited access to reliable electricity

High demand from businesses and communities

Supports other areas of programming, such as livelihoods and protection

BARRIERS

High upfront cost for streetlights

Requires community buy-in and coordination

Risk of vandalism or neglect

Requires long-term funding for maintenance

Project concepts

PROJECT REACH, TIMELINE AND BUDGET

50 marketplaces
$500,000
Two years

FURTHER INFORMATION

Street lighting is a public good that benefits the community. However, in the absence of clearly defined responsibilities, lights may be subject to vandalism or fall into disrepair. Ensuring that a local committee is responsible for the safety and maintenance of the lights will be critical to protecting them from damage and ensuring long-term functionality.

Initial costs likely need to be covered by donor funding due to high upfront investment, but the community could provide small regular payments into a collective fund for spare parts and maintenance. Certain types of streetlights can also provide power outlets for charging mobile phones and can provide important additional benefits to the community.

REPLICATION & EXPANSION

Replicates streetlight cooperatives established by the Renewable Energy for Refugees project in Rwanda

STAKEHOLDERS AND ROLES

Community groups and local leaders to identify streetlight locations and support outreach

Streetlight committee to manage oversight and minor maintenance

NGO to support training and community engagement

Local businesses to provide contributions for maintenance, if viable

Company to install the streetlights and provide spare parts when required

SCALABILITY

Moderate: The intervention could be replicated in many communities throughout Northern and Central Mozambique.

SOLAR LIGHTING FOR MARKETPLACES 2/2

Project concepts

FINANCING FOR HOUSEHOLD ENERGY

1/2

LOCATION

Central Mozambique (Manica and Sofala)

BACKGROUND

Displaced communities across Central Mozambique typically have limited access to finance. This severely limits households' ability to afford energy products, such as solar off-grid products and clean cooking solutions. Whilst households are interested in improved lighting and cooking solutions, the amounts they are willing and able to pay are well below the market prices.

Introducing different financing options could help to scale up access to sustainable energy for both electricity access and clean cooking. Collaborations between communities and microfinance institutions could establish local savings cooperatives to help people save for larger purchases. Implementing results-based finance (RBF) or voucher schemes for energy companies, meanwhile, could help to subsidise products and make them more affordable whilst also growing energy markets in displacement settings.

ACTIVITIES

Conduct comprehensive assessments on energy access, financial needs, and markets in selected areas

Engage local stakeholders (such as NGOs, companies, microfinance organisations, and community groups) to establish partnerships

Identify and select participants with relevant skills or strong community networks to form cooperatives

Set up approximately 20 savings cooperatives in partnership with microfinance institutions

Identify the necessary levels of subsidisation to make energy products affordable to different members of the community

Develop voucher system for energy products

Develop affordable pricing models and introduce flexible payment options in partnership with microfinance institutions

Issue tenders for off-grid lighting and clean cookstove companies to participate in the programme

Ensure all energy products meet international safety, efficiency, and performance standards

Provide training in financial management and literacy for both savings groups and participants

Implement ongoing marketing, promotion, and community awareness campaigns

Monitor the uptake of products and measure customer satisfaction

ENABLERS

Low access to financial services at present

Knowledge of and willingness to pay for energy products

High demand for clean energy for lighting and cooking

BARRIERS

Willingness to pay is below market prices

Limited experience of long-term financing

Challenges in establishing community finance groups

Requires close coordination between partners

Project concepts

PROJECT REACH, TIMELINE AND BUDGET

2,000 households
Two years
$400,000

FURTHER INFORMATION

Implementing any financial support mechanisms would require dedicated oversight from regulatory organisations to avoid any potential for misuse of funds. By providing financial support for both customers and companies, energy products can be made more affordable for communities whilst also developing market access and growth for suppliers.

Savings groups, RBF schemes, and voucher systems could implement initiatives to make energy products more accessible to particularly vulnerable groups, such as elderly or disabled people. This could involve further or complete subsidisation to ensure that the projects and inclusive and available to all.

REPLICATION & EXPANSION

RBF schemes have been implemented in Mozambique under the BRILHO programme

Community savings cooperatives have been implemented in displacement settings in Rwanda, Uganda, Ethiopia, and Kenya

RBF and voucher systems were successful in West Nile, Uganda and refugee camps in Rwanda

STAKEHOLDERS AND ROLES

Community groups to form savings cooperatives, work with local people, and promote financial services

Microfinance institutions to develop and implement flexible financing options and oversee savings cooperatives

Private sector to sell products through RBF schemes

NGOs to provide project coordination and oversee voucher systems

Government ministries to provide oversight and regulatory support

Donors to provide seed funding for savings cooperatives and capital for results-based financing

Communication partners and local media to drive public awareness campaigns and promote demand

SCALABILITY

High: The project has strong potential for scale-up, subject to the availability of sufficient funding.

FINANCING FOR HOUSEHOLD ENERGY 2/2

Project concepts

SOLAR IRRIGATION FOR IMPROVED AGRICULTURE

1/2

LOCATION

Northern and Central Mozambique (Cabo Delgado, Niassa, Nampula, Manica, Sofala)

BACKGROUND

Many people in displacement settings, both IDPs and host communities, depend on agriculture for both subsistence and income. Solar-powered irrigation presents an opportunity to increase yields but high upfront costs remain a significant barrier for smallholder farmers. This project aims to expand access to solar irrigation systems by promoting private sector involvement and enhancing financial access for community members. In doing so, it seeks to boost agricultural productivity, increase household incomes, and stimulate the development of local markets.

ACTIVITIES

Identify promising markets for solar irrigation products

Conduct market research and community engagement to assess market potential

Explore potential partnerships with organisations working on agriculture, nutrition, and food security

Develop financing models suitable for agricultural producers, such as flexible payments which can vary between seasons or long-term financing

Work with the private sector to strengthen supply chains and establish outlets in displacement settings through local distributors

Sell and install 250 solar irrigation systems to local agricultural producers

Train local technicians on system installation and O&M

Explore opportunities for other agricultural products, such as seeds, fertilisers and post-harvest tools to enhance productivity

Maintain solar irrigation systems to ensure longevity

Monitor system performance, yield improvements, and economic benefits

ENABLERS

Strong community interest and a sizable potential market

Beneficial for both displaced and host communities

Limited access to solar irrigation technologies in the region

Opportunities for integration with complementary programmes, such as food security and nutrition initiatives

Smart irrigation technologies, such as automated solar systems, provide significant efficiency improvements

BARRIERS

High upfront system costs

Low ability to pay and access to financial services at present

Requires flexible and accessible financing for customers

Working in remote areas with long supply chains and potential security challenges would have the highest impact

Project concepts

PROJECT REACH, TIMELINE AND BUDGET

250 solar irrigation systems

Three years

$500,000

FURTHER INFORMATION

Implementing long-term, flexible payment plans can significantly enhance the adoption of transformative but high-cost agricultural technologies, such as solar irrigation systems. These payment schemes should be designed to accommodate the seasonal and irregular income patterns common among smallholder farmers.

Substantial upfront capital, primarily from donor funding, will be necessary to cover initial system costs. This funding could be provided directly to consumers or channelled through companies, with independent oversight from NGOs, government bodies, or specialised financial institutions. Additionally, integrating this initiative with existing food security programmes can create synergies that promote increased agricultural productivity and broader development outcomes.

REPLICATION & EXPANSION

Builds on successful solar irrigation projects undertaken in displacement settings in Ethiopia and Uganda

Highly replicable across the country

STAKEHOLDERS AND ROLES

Private sector to set up operations and to install and maintain solar irrigation systems

Community leaders to support and promote the project

NGOs to assess market potential and support community engagement

UN agencies and government to support on related areas of programming, such as food security

Microfinance, credit organisations, or banks to provide affordable financing schemes

Donors to provide financing capital

SCALABILITY

High: Solar irrigation systems could be installed in many displacement-affected areas where agriculture is a common livelihood.

SOLAR IRRIGATION FOR IMPROVED AGRICULTURE 2/2

Project concepts

STANDALONE SOLAR SYSTEMS FOR PRIMARY HEALTH CENTRES

1/2

LOCATION

Cabo Delgado

BACKGROUND

Cabo Delgado has been severely affected by both disasters and ongoing armed conflicts. Both upon returning to their places of origin or settling in new locations, IDPs face urgent health needs which are difficult to meet due to damaged or destroyed facilities. Furthermore, the influx of people into new areas can put additional pressure on limited local infrastructure.

Solar energy systems can offer a sustainable and cost-effective solution for providing clean, reliable electricity to health centres which would allow them to improve healthcare outcomes to IDPs, especially as part of recovery and rebuilding efforts. Medical equipment can also be provided to health centres which currently do not have access to power to help to increase the quality of medical services in remote and rural districts.

ACTIVITIES

Conduct comprehensive energy assessments of example health clinics for pilot phase

Collaborate with healthcare staff to identify priority energy applications

Partner with the private sector to design and install solar systems equipped with battery storage

Supply essential medical appliances to primary health centres which lack electricity access

Train local technicians to maintenance the electricity systems

Involve local communities and government health authorities to foster project ownership and sustainability

Scale up system implementation to health clinics across Cabo Delgado

Implement remote electricity monitoring systems to ensure optimal performance and timely maintenance

Track system functionality alongside health outcomes

Assess opportunities for replication and scaling in other regions

ENABLERS

Government commitments to rural electrification and healthcare improvement

Decreasing costs of solar and battery storage technologies

Significant benefits of electricity in healthcare settings

BARRIERS

High upfront costs limit the accessibility and scalability of electricity systems for health centres

Security challenges and access constraints in conflict-affected areas including Cabo Delgado

Limited local technical capacity for maintenance of solar systems

Logistical barriers in remote and underserved communities

Risk of ensuring sustainability of funding for maintenance

Project concepts

PROJECT REACH, TIMELINE AND BUDGET

50 primary health clinics
Three years
$2 million

FURTHER INFORMATION

The project can employ a phased approach, initially focusing pilot projects in areas with the greatest need and gradually expanding as demonstrated impact and available funding increase. The modular nature of solar systems offer flexibility, enabling customisation to suit clinics of varying sizes and diverse energy requirements. Insights and lessons learned over the course of the project can inform best practices, facilitating effective replication in other underserved provinces. Furthermore, the project is designed to align with and support broader government initiatives and health sector policies, supporting sustainable long-term impact.

STAKEHOLDERS AND ROLES

Government ministries to provide policy support, identify priority health clinics for project implementation, offer technical guidance, and oversee project execution

Development and humanitarian organisations to deliver technical expertise, conduct training on medical equipment, and support O&M

Donors to provide grant funding for the procurement and deployment of solar energy systems

NGOs to lead project implementation and facilitate community engagement

Solar companies to design tailored solar systems, manage installation, and deliver ongoing maintenance services.

SCALABILITY

Moderate: The project could be scaled through a phased approach, dependent on available funding support.

STANDALONE SOLAR SYSTEMS FOR PRIMARY HEALTH CENTRES 2/2

Project concepts

RAPIDLY DEPLOYABLE ENERGY SOLUTIONS FOR EMERGENCY SITUATIONS

1/2

LOCATION

Nationwide

BACKGROUND

Mozambique is affected by both conflict and climate related displacements which require a rapid humanitarian response in disaster-affected areas. The provision of reliable power in remote areas can be difficult and often relies on expensive and polluting diesel generators. Rapidly deployable solar energy solutions offer fast, clean, and dependable energy for emergency response needs. These systems can be temporarily deployed and can be removed and repurposed depending on long-term requirements.

While pilot projects in other countries have demonstrated success, challenges with funding, ongoing maintenance, technical capacity, and policy support continue to restrict broader deployment. To address these, this project integrates a technical working group within existing coordination mechanisms, leveraging established platforms rather than creating parallel systems. This approach will strengthen existing structures by providing funding and resources to facilitate energy-specific activities, ensuring greater alignment and collaboration among stakeholders.

ACTIVITIES

Conduct comprehensive energy needs assessments for emergency healthcare and humanitarian facilities across areas prone to conflict and climate-related disasters

Establish a multi-stakeholder technical working group within an existing coordination mechanism to oversee planning, deployment, maintenance, removal, storage, and redeployment of energy systems

Design and deploy solar-powered portable systems tailored to needs of emergency response units and healthcare centres

Train technicians on operation, maintenance, and troubleshooting of deployed energy systems

Set up remote energy monitoring platforms and rapid maintenance teams to ensure reliability and timely resolution of technical issues

Develop strategic partnerships with private sector companies, donors, and international organisations to secure funding, technical expertise, and logistical support

Integrate disaster-resilient energy infrastructure in affected areas to enhance system durability and emergency preparedness

ENABLERS

High need for reliable power in emergency situations

Strong government commitment to disaster resilience and renewable energy adoption

Availability of donor funding and technical assistance from institutions such as UN agencies and NGOs

Declining costs of solar and battery technologies

Growing awareness of renewable energy benefits in emergency and humanitarian contexts

BARRIERS

Limited technical capacity for installation and maintenance in remote and disaster-affected areas

Security challenges in conflict-affected areas

Logistical challenges in transporting and deploying equipment during emergencies

Lack of policy mandates for renewable energy integration in emergency response

Unreliable funding for ongoing maintenance and replacements

Coordination challenges across multiple stakeholders and sectors

Project concepts

PROJECT REACH, TIMELINE AND BUDGET

150 emergency response units

2 years

$4 million

FURTHER INFORMATION

Pilot projects in other countries have demonstrated the success of rapidly deployable sustainable energy systems but challenges with funding, ongoing maintenance, technical capacity, and policy support continue to restrict broader implementation. To address these, this project advocates for a technical working group to be integrated within an existing coordination mechanism, leveraging established platforms of government agencies, private energy companies, and humanitarian partners rather than creating parallel systems. This approach could strengthen existing structures by providing funding and resources to facilitate energy-specific activities, ensuring greater alignment and collaboration among stakeholders.

REPLICATION & EXPANSION

Scalable to other countries with similar emergency and disaster risks

Modular and portable systems enable adaptation to various facility sizes and contexts

Potential integration with national disaster management and health infrastructure programmes

STAKEHOLDERS AND ROLES

National and local ministries of health, emergency management, and environment to provide policy support, coordination, and technical support

Donors to provide funding and ongoing financial commitments

Humanitarian agencies to provide technical expertise and support the implementation of energy solutions

Private solar companies to design, deploy, and maintain energy systems

SCALABILITY

High: The modular design and portable deployment model, alignment with national and regional emergency response, and climate adaptation goals supports replication.

RAPIDLY DEPLOYABLE ENERGY SOLUTIONS FOR EMERGENCY SITUATIONS 2/2

07

Conclusions

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Key issues for energy access

Mozambique hosts more than 1.3 million IDPs and returnees, with around half living in host communities and half in displacement sites. Ongoing conflict in the northern province of Cabo Delgado has driven displacement in the region whilst the country remains highly vulnerable to climate-related events, especially from cyclones, which have displaced people across the country for many years.

Access to energy in displacement-affected areas is typically low. Households generally lack access to electricity for lighting, and off-grid solar products are financially out of reach for most. Lighting is a high-priority need across many displacement sites and introducing financing and flexible payment options could improve the affordability of solar products. Suppliers could also be supported to establish repair and maintenance facilities near communities to ensure long-term functionality of products and services.

Most households use three-stone stoves and firewood for cooking. Fuelwood is collected locally, exposing people to protection risks, and households employ a range of coping strategies when fuel is scarce. The primary barrier to clean cooking is affordability; expanding access to finance and savings groups, alongside public awareness campaigns, could enable households to adopt improved cooking solutions.

Businesses are constrained by limited electricity access and a lack of productive use appliances, which restrict livelihoods opportunities and income generation. Access could be improved through financial services and cooperative models to share the cost of more expensive equipment, such as agricultural machinery. Schools in resettlement sites generally do not have access to electricity and lighting in public areas is rare. Addressing the high equipment costs for community facilities is a key challenge but could be mitigated through private-sector partnerships and community consultations to prioritise areas of greatest need.

Despite these challenges, there are significant opportunities to improve sustainable energy access. Long-term financing mechanisms through community savings groups, results-based financing, and voucher programmes could make electricity and cooking solutions more affordable whilst stimulating energy markets. Standalone solar systems for schools and health centres could enhance service delivery for displacement-affected communities, whilst irrigation systems and street lighting could improve protection and food security. Rapidly deployable solar systems could also provide ready-to-use sustainable energy to support the humanitarian actors responding to new emergencies.

Supporting market systems in displacement settings will help to scale up access to sustainable energy.

The road to sustainable energy in displacement settings

Improving access to sustainable energy will require strong linkages with the humanitarian-development-peace nexus, support for building long-term solutions and market-based approaches, and a central role for displaced and host community members in the design and implementation of any intervention.

The READS workshops brought together a diverse range of stakeholders to co-design potential high-impact projects. Whilst these are presented as individual opportunities – and would each merit investment and implementation on their own – rolling out coordinated interventions addressing several energy themes together could have a truly catalytic effect on increasing sustainable energy access as a whole.

Acknowledging this, and the work of other initiatives, the roadmap below presents a vision of how access to sustainable energy in displacement settings could develop in the short, medium, and long term. ››

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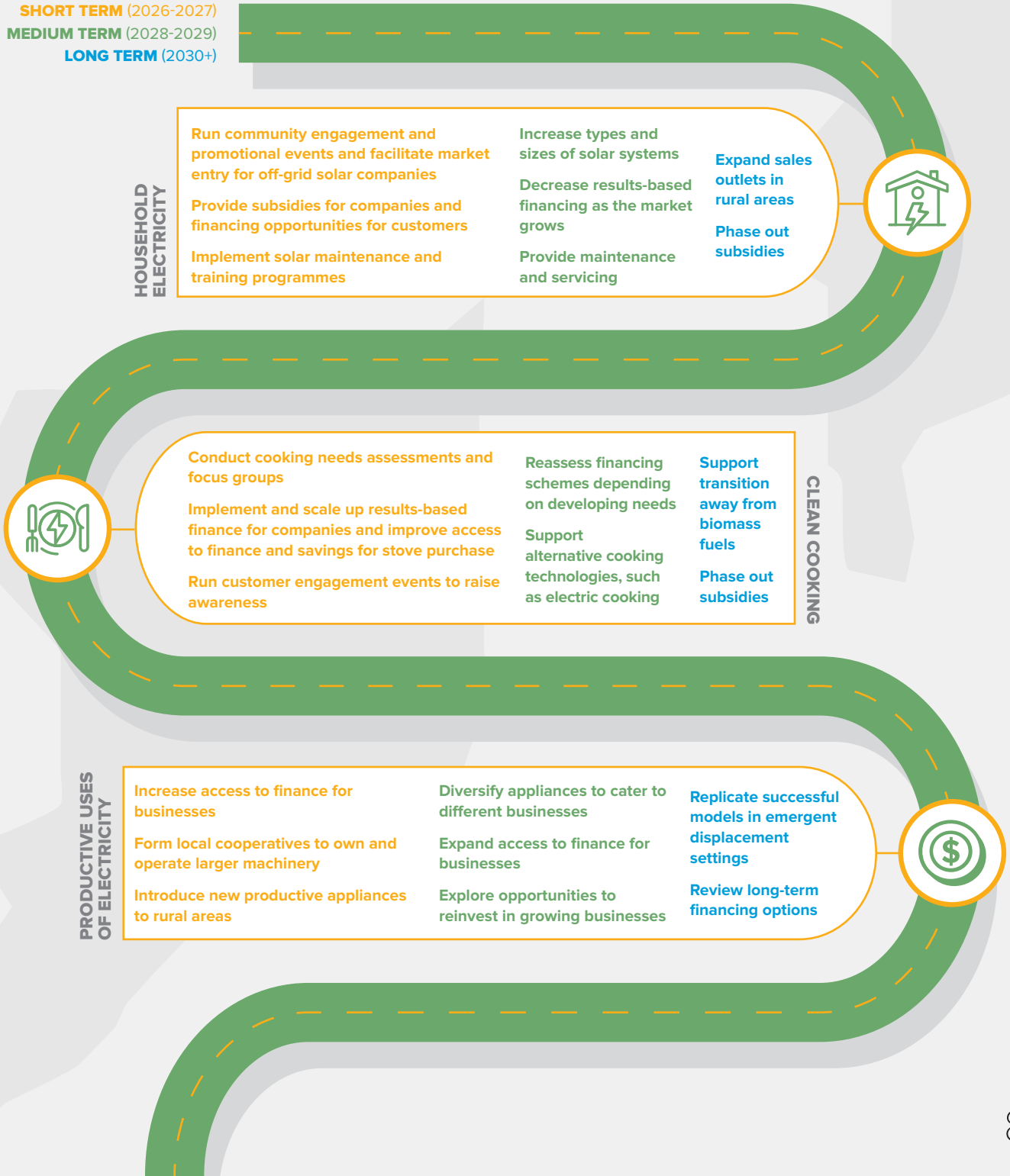
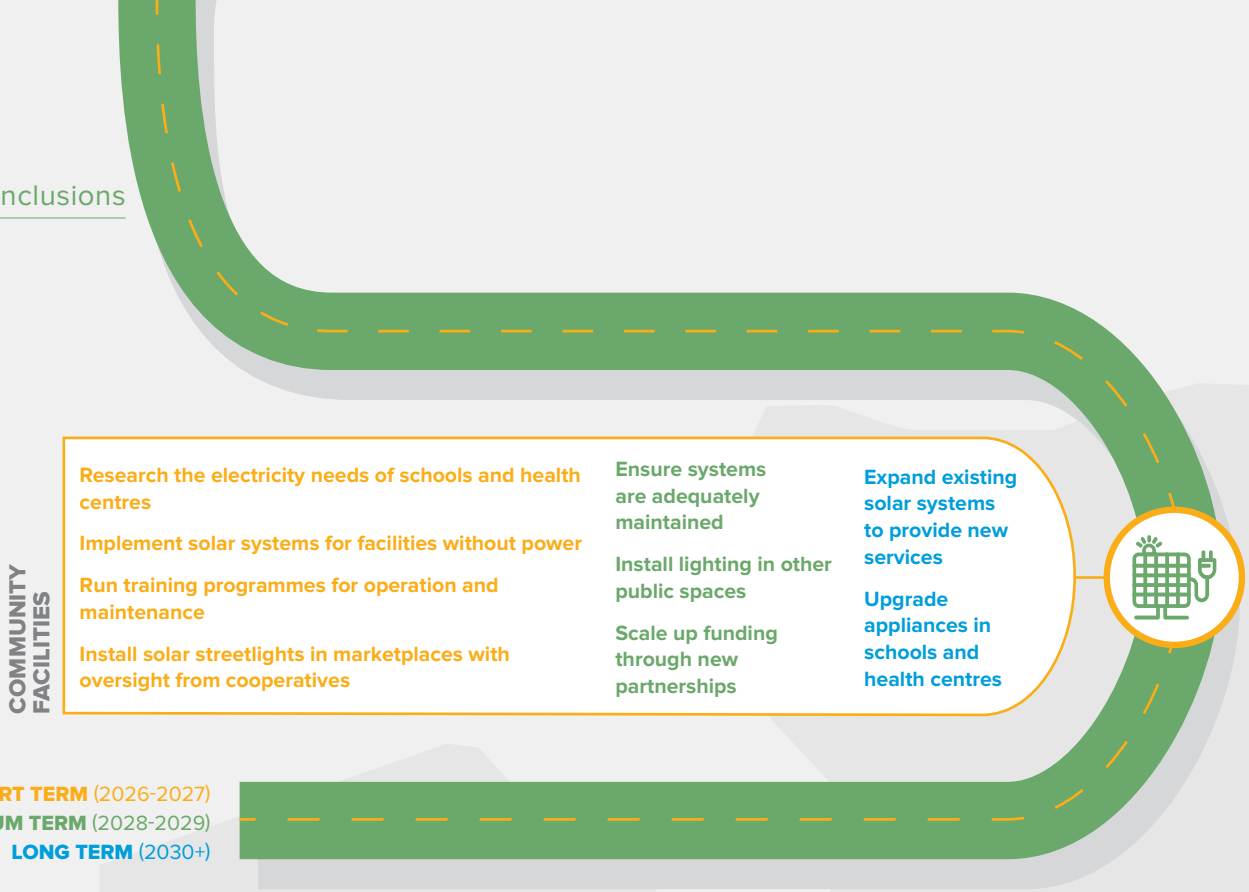
The road to sustainable energy in displacement settings





The challenge is significant: achieving access to affordable, sustainable, reliable and modern energy in displacement-affected areas by 2030 will require more projects, activities, partners, coordination, and investment than ever before. Mozambique offers an exciting environment for greater investment in sustainable energy solutions for households, businesses, and community facilities to improve the wellbeing and quality of life for IDPs, returnees, and host communities across the country.

All stakeholders will need to play a role, with displaced people and host communities in the centre, to improve access to sustainable energy.

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