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POWERING HEALTHCARE IN MALAWI

A report into the challenges which lead to the failure of many solar systems within health clinics in Malawi, how these challenges can be addressed and why solar systems still offer the potential to solve the energy crisis facing rural health facilities in sub-Saharan Africa.

INTRODUCTION

Access to electricity is essential in healthcare settings, but an estimated one on four health facilities across Africa are not connected to the grid, with a staggering 3 in 4 with unreliable access*. In Malawi, the energy situation is no different, with only 4% of the rural population connected to the electricity grid. The Ministry of Health and Population in Malawi recognises the important role solar systems can have to help solve the dire situation facing many health centres across the country.

It is widely acknowledged, however, that while solar systems offer a solution to the energy crisis facing rural health facilities, many solar systems in the past have fallen into disrepair due to a lack of post installation support and maintenance. A survey, carried out in over 150 health facilities across the country by the UN Foundation in 2015 found that only 57% of solar systems were functional.

SolarAid's mission is to find solutions to these challenges, so in 2021, together with Mzuzu University in Malawi, we carried out our own research in rural health facilities across the central region of the country, to help deepen our understanding of why so many systems are failing and to help us develop viable solutions which address these problems.

OUR FINDINGS

Of the 24 health facilities surveyed, a staggering 87.5% had solar systems which had either failed completely or were underperforming. In the vast majority of cases, battery failure was the main cause of failure, (76%), followed by inverters (11%). We also found that systems would typically operate for 2 – 4 years before falling into disrepair. In a number of cases (8%), theft of key components led to failure.

WHY ARE SOLAR SYSTEMS FAILING?

Our research found that there are a number of key reasons why so many systems fail:

1. Lack of Finance
Healthcare facilities lack reliable long term financial support mechanisms for replacement of batteries at the end of life.

2. Insufficient Monitoring
There are typically no systems being used to track performance issues.

3. Insufficient Maintenance
Lack of maintenance planning and skilled technical personnel in remote areas and limited access to spare parts.

4. Lack of Responsibility
Overall, no one entity takes full responsibility for ensuring systems remain in operation.

5. Quality Issues
We found that the quality of installations was often not good enough.
Issues included:

- Variable quality in the physical structures supporting solar modules;
  - Mismatch of solar panels in a single solar array
  - Poor orientation of solar modules, with many shaded between 9am and 3pm
  - Batteries without adequate information – making replacement difficult – in some cases, replacement batteries were provided, but were incompatible;
  - Variable quality of electrical wiring – with poor general aesthetics - often referred to as 'spaghetti solar'. This means either installation quality was substandard or systems are 'messed up' post installation by people trying to make things work

WHAT HEALTH WORKERS TOLD US

While health workers found the photovoltaic systems useful, perhaps unsurprisingly, given the high rate of failure, 85 % of those we spoke to reported low levels of satisfaction with the performance of the solar systems.

In some cases, health care workers have resorted to providing their own personal batteries and inverters in order to keep the lights on in their health facility.
A nurse at one health centre we visited, reported that a Medical Assistant left the health care facility just one week after reporting for duty, due to lack of reliable electricity both at home and at the health care facility.

We were also told that workers sometimes found it tough to decide whether or not to respond to knocks by those seeking medical care at night, due to the lack of light and power. All of these issues impact negatively on health care provision.

RECOMMENDATIONS

While there are clearly many challenges which lead to the premature failure of solar systems in health facilities, none are insurmountable. We therefore recommend the following:

- Installed solar systems should have a robust maintenance and management plan in place, with clear agreements on who is responsible for system upkeep. These plans must include a robust financial plan which will ensure that necessary funds are available for systems to remain operational.

- A service model should be considered whereby the systems are regularly up kept by a professional service provider, which will ensure systems remain operational.

- Solar should be positioned as a practical power solution, but not as one which is free. Health and energy authorities should recognize that funds are needed to ensure systems are maintained and fully operational.

- Remote Monitoring of systems will enable a provider to quickly see when a system is under performing, identify faults and implement solutions

WHAT WE ARE DOING NEXT

We have seen that many traditional solar systems need to be installed by qualified electricians, adding complexity and expense to their deployment. We have also seen that many systems fall into disrepair. With 1 in 4 health facilities across the continent, operating without access to electricity, we know that, despite all the challenges, solar systems are capable of quickly transforming this situation, such that no facility is without power and left in the dark each night.

SolarAid is therefore developing and implementing projects which seek to address every challenge head on. Here's how:

- Rapid deployment of the latest plug-and-play Pay-As-You-Go (PAYG) solar systems in small rural health facilities. These systems use the latest lithium ion batteries, operate without inverters and, crucially, do not require solar technicians for installation.

- Combining plug and play solar systems with the latest energy efficient medical appliances to immediately increase the range and quality of services offered at rural health facilities.

- Every solar system we install is equipped with remote monitoring technology that enables us to monitor system performance and energy use at the health facilities.

- We are testing a range of financial and maintenance models with facilities, which includes a service model that will ensure that the lights stay on at every health clinic.

- We are working with health partners to find ways to refurbish and ensure ongoing performance of failed systems.

References

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