

Solar PV installation in Ugandan health centers

INTRODUCTION

More than 1.1 billion people in the world, including 600 million people in Sub-Saharan Africa, lack access to electricity (UN, 2011). Power consumption in Africa is 180 kWh per capita per annum, compared to 6,500 kWh in Europe. More than 75 per cent of the East African population is without electricity and 90 per cent depends on solid traditional biomass fuels for cooking.

Although Uganda is making progress towards achieving Sustainable Development Goals (SDGs), a lot more still needs to be achieved to increase energy access to rural populations. According to a recent World Bank report, the overall national electrification level in Uganda was 19% in 2016 and currently it is estimated at 28%. The rural electrification level is lower, at about 7-8%.

Covid-19 and Energy

Energy plays a vital role in strengthening health systems, particularly health care delivery. Hospitals and clinics require electric power for myriad uses, from lighting, ventilation and cleaning to refrigeration for vaccines, lab work, surgery and running life-saving equipment such

as ventilators. Energy powers health facilities, the medical services they provide and related areas such as staff housing. As COVID-19 spreads to Africa, a lack of energy security is apparent in hospitals which rely on a constant electricity supply to power crucial ventilators. In parts of Sub-Saharan Africa, it is estimated that only



28% of health facilities have access to reliable electricity. If hospitals and local communities don't have access to power, this could magnify the human catastrophe and significantly slow the global recovery. Reliable, affordable electricity is needed to keep people connected at home and to run life-saving equipment in hospitals.

The pandemic has put pressure on developing countries such as Uganda that are already facing major challenges before COVID-19, this pressure will be particularly painful. Yet a recent analysis of health care facilities in 11 Sub-Saharan countries commissioned by the World Health Organization (WHO) revealed that on average more than a quarter of health facilities in countries such as Uganda lack access to electricity. While most large hospitals lack access to electricity, access rates drop to below 25% for rural health centers. Reliability of energy supply remains a challenge especially in these challenging pandemic times and worse still even the health facilities connected to the grid many suffer from frequent power outages.

In the current COVID-19 pandemic situation the need for modern energy services is more than urgent in Uganda. Efforts to improve health needs for the most vulnerable populations in Uganda cannot be underestimated. Decentralized energy solutions are the lowest cost and most practical way to provide power in remote and off grid health centers. Efforts to improve health outcomes present a major opportunity to improve access to and the quality of health services.

Currently, 50% of public health centers in Uganda do not have access to electricity and functionality of installed solar PV systems remains at below 50% due to inadequate operation and maintenance.¹ The proposed project seeks to deploy clean energy solutions such as solar PV, institutional energy efficient cookstoves and Liquefied Petroleum Gas (LPG) to provide energy access to health facilities in Uganda.

UNDP in collaboration with the World Health Organization and the Ministry of Health-Uganda is supporting the electrification of 23 health centers as part of COVID 19 response. In the first phase of the programme, 11 health centers have been supported across the country and site assessments are being undertaken to support additional 13 health centers.

The goal of the initiative is to improve access to energy services for 30 health facilities across the country in the vulnerable communities in Uganda. This part of UNDP's integrated support to COVID 19.

Expected results/outcomes

This solarization of the health centers is expected to contribute to the following outcomes.

- Reliable energy supply to the health centers
- Increased ability of health workers to handle emergency situations
- Improved health and wellbeing of the vulnerable populations
- Improved response by health workers to handle COVID19 cases and other medical conditions

Energy requirements in the health sector

The energy load for the health centers based on the equipment utilized and energy consumption data. According to the powering health assessment report by USAID, below is the categorization of the health centers based on their energy requirements.

| Health Centre category | Capacity | Government categorization | Energy requirements |
|------------------------|----------------|---------------------------|---------------------|
| I | 0-60 beds | I-II | 5-10 Kwh/day |
| II | 60-120 | III | 10-20 Kwh/day |
| III | Above 120 beds | IV and above | 20-30 Kwh/day |

¹ WHO Report (2018) Energy for the health sector

Target health centers

A total 11 health centers IVs have been supported across the country because they have the highest demand for energy services based on the categorization below;

- Energy requirements are 20 – 30 kWh/day
- Have approximately 120 beds or more
- May serve as a regional referral center and coordinate communication between several smaller facilities and hospitals in large cities
- May need to communicate with remote health centers and hospitals by way of telephone, fax, computer, and Internet
- May contain sophisticated diagnostic

devices (x-ray machine, CD4 counters, blood typing equipment, etc.) requiring additional power

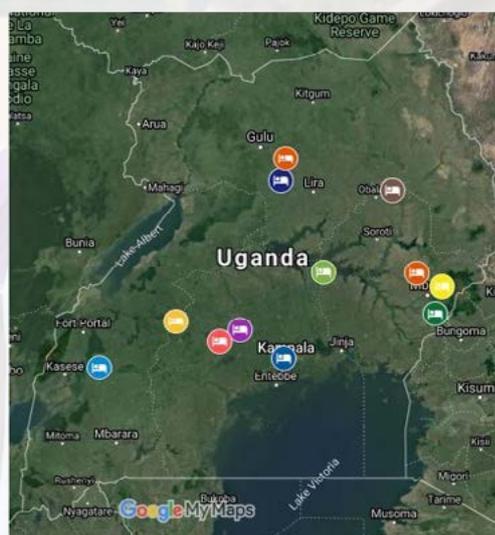
The supported health centers are in different districted located in the Central, Western, Eastern and North Eastern parts of the Country.

The prioritized health centers were selected by the Ministry of health and the criteria for selection was based on the Standard Unit of Operation. Health centers that outpatient ration have a high outpatient ration and unreliable energy supply were selected.

Below is a list of health centers that have been supported and their locations.

Completed installation

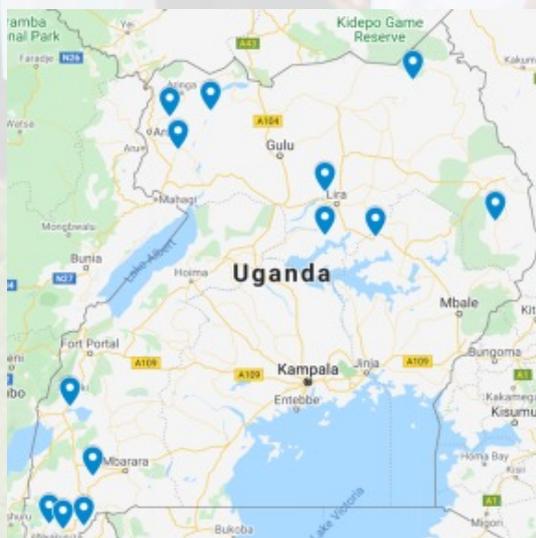
| Districts | Health Facility |
|---------------|-------------------|
| 1 Kamwenge | Rukunyu HC IV |
| 2 Kiboga | Bukomero HC IV |
| 3 Bukedea | Bukedea HC IV |
| 4 Buyende | Kidera HC IV |
| 5 Sironko | Budadiri HC IV |
| 6 Oyam | Anyeke HC IV |
| 7 Manafwa | Babulo HC IV |
| 8 Kakumiro | Kakumiro HC IV |
| 9 Kapelabyong | Kapelabyong HC IV |
| 10 Kazo | Kazo HC IV |
| 11 Omoro | Lalogi HC IV |



Ongoing assessments

UNDP is conducting assessments in new 12 health centers across the country indicated below.

| Districts | Health Center |
|---------------|-------------------|
| 1 Nabitulak | Nabitulak HC IV |
| 2 Terego | Omugo HC IV |
| 3 Kwania | Kwania HC IV |
| 4 Obongi | Obongi HC IV |
| 5 Sheema | Shuku HC IV |
| 6 Madi Okollo | Madi Okollo HC IV |
| 7 Karenga | Karenga HC IV |
| 8 Kalaki | Kalaki HC IV |
| 9 Kasese | Nyabirango HC IV |
| 10 Rubanda | Rubanda HC IV |
| 11 Kole | Aboke HC IV |
| 12 Rukiga | Kamwezi HC IV |
| 13 Rukiga | Mparo HC IV |



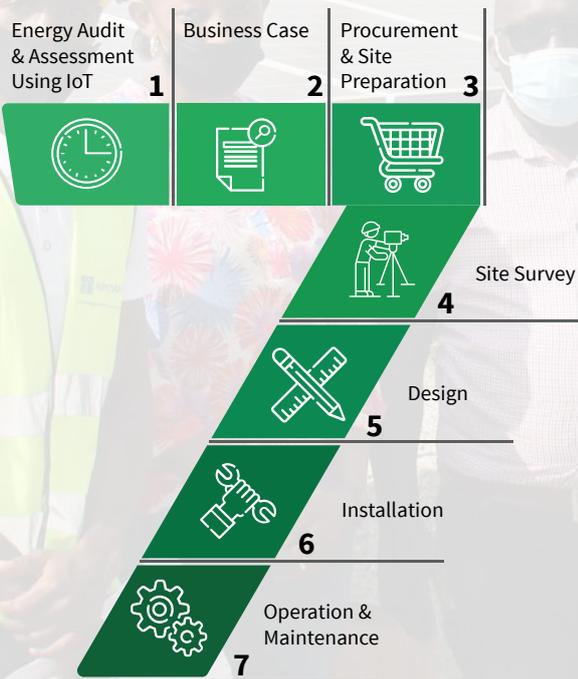
Process for the solarization of the health centers

A 7 step-wise process for the solar PV installations was undertaken which includes the following steps;

| | |
|---------------|--|
| Step 1 | Energy audit and assessment |
| Step 2 | Business case (technical, economic and environmental analysis) |
| Step 3 | Procurement and site inspection |
| Step 4 | Site survey through site survey by the vendor to collect data on the energy load |
| Step 5 | Design of the solar systems |
| Step 6 | Installation by the vendor and local partner |
| Step 7 | Operation and maintenance |

7 Step Green Energy Solution

Recognized best practice by UNDG for Solar implementation



Continuously striving to promote efficiency across solar implementations and enhancing user behavior

The installation process includes procurement of system components, shipment, custom clearance, acceptance of the goods where inspection was conducted at the warehouse to verify the Bill of Materials before the installation.

Below is the detailed information on the installation process.



Operation and Maintenance for sustainability of the solar PV installations

UNDP established a three year operations and maintenance contract with the vendor/company supporting the installation of solar PV systems. In addition, an online monitoring system has been set up to monitor the functionality of the systems.