

**DOCUMENTATION OF SGP SUPPORTED SOLAR POWERED
HOSPITAL PROJECTS
IN
MROGORO AND KILIMANJARO REGIONS**



**CONDUCTED BY DEODATUS M. MFUGALE
NATIONAL STEERING COMMITTEE MEMBER
SMALL GRANTS PROGRAMME
JULY 21 – AUGUST 1, 2019**

A: EXECUTIVE SUMMARY



Doctors conducting a major round in the male ward at St. Francis Referral Hospital, Ifakara

The development of human beings has, since time immemorial, been grounded on access to energy. Those who have had access to energy for various uses have seen their lives rising one step after another on the ladder of wellbeing through improved health, better means of transport, and availability of abundant nutritious food, among others. For without availability of and access to energy, countries are likely to make slow progress towards development and the sustainable development target can hardly be met.

The Millennium Summit of the United Nations that was held in year 2,000 adopted the Millennium Development Goals (MDGs) and the then 189 member countries and 23 international organizations committed to achieve the goals by 2015. Among the eight goals, five are directly dependent on availability and access to energy. To eradicate extreme poverty and hunger, To achieve universal primary education, To reduce child mortality, To improve maternal health and to ensure environmental sustainability – all these goals depend on access to energy in order for countries to realize them.

The successor of MDGs, the Sustainable Development Goals (SDGs), is more specific on the importance of energy to development and human life in general. There are 17 SDGs out of which 11 are related to availability and use of energy. In particular, SDG 7 highlights the need for availability of affordable and clean energy as the driver of human development. Other SDGs such as No Poverty, Zero Hunger, Good health and wellbeing, Quality education, clean water and sanitation, Decent work and economic growth and industry innovation and infrastructure all focus on availability of reliable energy is the primary driver in order to achieve them.

Although the Tanzania Development Vision 2025 does not specifically emphasize the importance of energy as the main driver of development, it highlights access to quality primary health care for all, access to quality reproductive health services for all individuals of appropriate ages, reduction in infant and maternal mortality rates by three-quarters of current levels and universal access to safe water as key elements of development. These rhyme with MDGs and SDGs and in effect, require access to and availability of energy in order to be achieved.

In 2011 the UN launched the Sustainable Energy for All (SE4ALL) programme which seeks to ensure that everyone can access sustainable energy by 2030. The programme also seeks to improve energy efficiency and increase the use of renewable energy for all, as part implementation of Sustainable Development Goal 7, Universal Access to Energy by 2030. Access to cheap, reliable, clean and sustainable energy will raise the quality of life particularly among marginalized communities.

The International Energy Agency (IEA) says that in 2013, approximately 1.3 billion people throughout the world lacked access to electricity; 620 million of these lived in sub-Saharan Africa where poverty is high. In this case, improved access to energy is an essential means of overcoming poverty, meeting basic needs and promoting economic activity. Renewable energy together with improved energy efficiency could contribute substantially towards achieving the SDGs which enhance energy security, reduce health risks, increase agricultural productivity and conserve natural resources.

A report on SDG 7 progress published in May this year warns 650 million people could lack electricity access in 2030 unless efforts are scaled up and sustained. The “Tracking SDG7: The Energy Progress Report” concludes that ensuring affordable, reliable, sustainable and modern energy for all by 2030 is still possible but that more financial commitment is required.

In November 2016 at the UN COP22 in Marrakesh, Morocco, 48 countries including Tanzania, committed to meet 100 percent to strive to meet 100 percent domestic renewable energy production as rapidly as possible while working to end energy poverty, protect water and food security, taking into consideration national circumstances. These countries are among the most vulnerable countries and are united as the Climate Vulnerable Forum.

Access to energy is still a challenge in Tanzania. It is estimated that around 70% of the population relies on biomass energy (charcoal and firewood) for cooking, which leads to the deforestation of about 400-500 hectares annually. The use of modern cooking technologies is limited by lack of access to efficient and environmentally friendly charcoal production as well as high costs of alternative energy sources, such as natural gas.

Given these circumstances, UNDP in Tanzania works with other stakeholders to provide access to energy for people in underserved areas. The focus is on unlocking the natural renewable energy potential of Tanzania in order to achieve sustainable energy for all in line with the UN declaration.

Through the Small Grants Programme UNDP has supported the provision of solar electricity for hospitals in Morogoro and Kilimanjaro regions with the aim to raise the quality of life among local communities, to conserve the environment and enhance people's livelihoods and well being.

B: INTRODUCTION



Solar panels and lightning arrester purchased and installed at Mbingu Catholic Health Centre with funds from UNDP Small Grants Programme.

Between 2006 and 2018 The Small Grants Programme has supported five health facilities with funds to install various solar systems in Morogoro and Kilimanjaro Regions. In 2006, the Programme facilitated the purchase and installation of five solar heaters at Huruma Designated Hospital in Rombo District of Kilimanjaro Region. The hospital admits 300 patients and given the cold weather in the area, the need for patients to take hot water may not be overemphasized. Installation of solar heaters was not limited to the provision of hot water for the patients, it was also a measure that would lead to conservation of the environment and subsequently contribute to the fight against climate change; the hospital used 20 lorries of approximately seven cubic meters every month. According to the management, the hospital used about 560 tons of firewood annually. This contributed to severe deforestation of Kilimanjaro Forest and accounted for significant amounts of CO₂ emissions by cutting trees and leaving the land almost bare and also by using firewood as biomass fuel which also produces CO₂ emissions. Installation of solar water heaters would also cut down the hospital's running costs. Four wards and the operating theatre were fitted with the heaters, with total costs amounting to about USD 51,000.

Another beneficiary of the programme was St Francis Referral Hospital in Ifakara, Morogoro Region, which in 2009 received funding for solar electrification of the hospital. Until then the hospital had been using a diesel generator that cost the hospital about USD22, 000 every year. The old-model generator emitted a lot of CO₂ which experts calculated at 53, 280 kgs, let alone the noise it caused which in turn disturbed patients. Although the hospital was connected to the national electricity grid, there was a total of four months of blackout every year. The situation not only interrupted the provision of services but was a hindrance to quality health services for the community that generally comprised poor people. Installation of solar electricity would also put on hold the increase in hospital charges thus relieve the poor community of a heavy burden. The SG Programme awarded about 69m/- for this project.

Lugala Lutheran Hospital in Malinyi District was another beneficiary. UNDP through the Small Grants Programme supported the rehabilitation and capacity expansion of the solar plant at the hospital which had been destroyed by lightning. The damage forced the hospital to use a diesel generator for supply of electricity and this increased the hospital's running costs through purchase of diesel. It also increased CO₂ emissions which experts said stood at between 66.6kg and 244.2 kg per day. At this point there was no other alternative source of electricity because the hospital and indeed the whole of Malinyi village had not been connected to the grid. With support of the SGP, the hospital purchased and installed new parts (solar batteries, inverter, lightning arrestor)at the cost of 38m/-. The rehabilitation and increased capacity was meant to reduce the hospital's running costs from 198,000/- to 54,000/- per day and reduce CO₂ emissions to 60kg per day. It would also make services affordable for the marginalized community members and thus improve their wellbeing.

Mbingu Catholic Health Centre in Kilombero District has also benefited from UNDP's Small Grants Programme. In 2015 the Health Centre was granted 75m/- for the purchase of a solar generator to replace the diesel generator which was operated for only four hours a day during the night. Due to the high running costs the Centre ran without electricity during some days because it could not afford the costs. Lack of regular and reliable electricity affected the quality of service and damped staff morale particularly those who had to work at night. The condition also frustrated the medical staff because they could not offer their best to provide services and save lives of members of the marginalized community who sought services from the Centre, the only medical facility available within the area. A similar facility was available 60 kms away in Ifakara which was not easily

accessible not only because of the poor road but also because community members could not pay for the transport costs involved.

With reliable supply of electricity the Centre hoped to improve maternity services through caesarian section and provision of oxygen to children who might have difficulty in breathing for various reasons. It also expected to improve immunization services as refrigerators in which the drugs are kept will have a guaranteed supply of electricity. The use of solar electricity would also reduce CO2 emissions from the diesel generator which was estimated to be 48,681kg annually.

The latest recipient of the Small Grants programme was Mahenge District Hospital which in 2017 received USD 49,584.00 for the purchase and installation of a solar backup system. The hospital was built before independence and although it has been connected to the grid, the supply of electricity was irregular as power cuts were common. Generally the hospital could not deliver quality services to the community as well as people for far flung areas because it also acted as a district referral hospital, receiving patients from the whole of the then Ulanga District which comprised what is today Malinyi, Kilombero and Ulanga Districts. The installation of the solar backup system was thus meant to provide electricity in key areas including the main theatre, labour ward, maternity ward and other wards. Generally all grants provided have been used for the intended purposes and have had significant impacts in three areas: Provision of quality medical and related services like improved immunization, conducting operations smoothly and adequate facilities in various units. Another impact is seen in the reduction of deaths, particularly in the operating theatres where sudden blackout often led to patients losing lives. Significant impact is also seen in conservation of the environment and fighting climate change where reduced use of firewood has checked deforestation and reduced CO2 emissions.

Other important impacts have been the normalisation of relationships between hospital staff and patient's relatives who usually blamed the former for negligence whenever deaths occurred. With the low number of deaths, the blames have also weakened. The morale of members of staff is also high, now that they don't have to work in semi-dark conditions and their work is not interrupted by power cuts. The other side of the coin shows that some of the facilities have been rendered useless due to technological hitches and failure to oversee scheduled maintenance and services. In some hospitals there are no qualified technicians to serve the facilities and instead, experienced staffs in other fields are adopted to do jobs that require technical knowledge.

The grants have, in some cases, acted as catalysts for the hospital management to acquire funds from other sources to provide solar electricity for units that have not been covered by the grants. Such facilities include solar water pumps and specific supply to blood banks and the purchase and installation of solar batteries.

It would also appear that in some cases, the project proposals were initiated by individuals with little or no participation of other members of the management team. The result is that when such a ceased to be the employee of the hospital, then no one else could provide details about the project nor link UNDP to the facilities. Even contact addresses were for individuals, some of who had changed them and their whereabouts are unknown.

C: DOCUMENTATION OF EXISTING PROJECTS



Solar panels dismantled from one building at St Francis Referral Hospital to give way for renovation of the buildings.

The basic object of the assignment was to record success of UNDP interventions through the Small Grants Programme in relation to the problems that were meant to be solved. It was also meant to determine if such interventions have been replicated by other organizations either within the hospitals or in the surrounding community; whether communities have adopted the use of solar electricity or if

some other organizations have financed the expansion of solar capacity in the hospitals so as to provide for other units that were not served by UNDP interventions. Another objective was to examine how management have taken measures to sustain the interventions through service and maintenance as well as soliciting additional funds from other sources in order to expand the capacity to produce more electricity so as to respond to increasing demand for renewable energy within the hospitals.

C: 1: METHODOLOGY



Director General of St. Francis Referral Hospital Ifakara, Dr. Fr. Wilfred Gingo speaking to the mother of a child admitted to the hospital.

The first step in executing this assignment was to read some background information about the hospitals. The important info was to know the geographical location, the ownership, the estimated number of people who benefit from its services and the challenges it faces in providing quality services.

On reaching the hospital I interviewed Doctors In-charge of the facilities and other staff members in order to get a glimpse of situations before the projects began. This was meant to find out the rationale for the interventions; that there were indeed some serious problems that required the support of UNDP in order to be solved. I also wanted to get information on the current situation; to learn what has changed and maybe what is yet to change despite the interventions. During

interviews also wanted to know the plans for sustaining the gains from the projects and what plans the hospitals have to expand the supply of solar electricity in order to meet current and future demand. In almost all the five hospitals the number of patients is on the increase, a situation which calls for a commensurate expansion of the supply of electricity in order to serve the patients appropriately.

The interviews also involved some patients in order to get their word about the quality of services after installation of solar electricity.

Another method employed was observation. I made a tour of the various units of the hospitals in order to see the installation of particular equipment or accessory and to determine if it is functioning as required. In these tours I was accompanied by the doctor in-charge and the technician. In some cases the hospital secretary accompanies us.

C: 2: THE FINDINGS



Mr. Emmanuel Rulashisye, a laboratory Technician at Mbingu Catholic Health Centre

Generally, all hospitals that have received grants have managed to improve their services and sustain the quality that they have attained. In some cases, the equipment and services have since deteriorated for various reasons including poor service and maintenance. These are the findings for each of the five hospitals that are beneficiaries of UNDP interventions through the Small Grants Programme.

C: 2: 1: HURUMA DISIGNATE DISTRICT HOSPITAL



Solar panels and solar heater as seen outside the Operating Theatre building at Huruma Designated District Hospital in Rombo, Kilimanjaro Region. The solar electricity system was purchased and installed with funds from UNDP Small Grants Programme.

The hospital was built 1969 by the Roman Catholic Diocese of Kilimanjaro and inaugurated by President Julius K Nyerere on April 1, 1970. It has now clocked 50 years of service and serves as the Rombo Designate District Hospital.

Hospital admits an average of 200 patients and attends to a similar number of outpatients. In 2007 UNDP through SGP financed the purchase and installation of five solar water heaters at the cost of USD 46,108. The heaters were installed in children's ward, infectious diseases ward, women's ward, men's ward and private ward & operating theatre. The demand of solar water heaters rose from the fact that the area is usually very cold throughout the year and patients and staff have to take hot baths in order to be comfortable. It was important to install water heaters because the hospital was using close to 500 tons of firewood in a year, thus accelerating deforestation and accounting significantly for CO2 emissions. Installation of solar heaters was also meant to cut the hospitals running costs incurred through purchase of firewood.

Over the years 13 more solar water heater units were bought and installed through various sources of funding, thus making 18, the total number of the facilities. However, to date all the units are nonfunctional except one that supplies water to the operating theatre. This is the only one that bears witness to UNDP intervention through the Small Grants Programme.

There are several reasons behind the defective units. The major one is acute shortage of water that hit the hospital for some time. In the face of this shortage, the water tanks pumped little or no water into the heaters and caused them to “burn out” as they did not have built-in automatic switches to cut-off electricity when the heater tanks had no water. Some of the water heater tanks are worn out due to being unused for a long time.

Another cause of the breakdown is said to be lack of scheduled service of the systems. It would appear that there came a time no one cared to follow the schedule and as such the facilities overran the scheduled checkups as well as replacement of parts that had overrun their useful lives. Without maintenance some parts of the facilities became defective and eventually the whole system collapsed. Another reason related to this is the fact that the hospital lacks requisite expertise to take care of the facilities. The person who had sufficient knowledge to oversee their operation left the hospital and he has never been replaced. The current employee who takes care of the remaining facility is a plumber by profession and his only claim of expertise is the experience he has gained over 27 years that he has worked at the hospital. But it would also appear that the whole process of obtaining funding for the facilities, the procurement process, the installation and even the maintenance schedule were all a one-man affair. During the discussions I held with the Dr in-charge, Wallboard Kyejo, the Hospital Secretary Sr. Carisma Dominic and the man who oversees the running of the facilities Hipoliti Gervas Kimaro, it came to light no one knows how to initiate the process to look for funds in order to acquire new facilities. According to Mr. Kimaro the heater units came with a package spare parts and once the stock was finished he was at a loss as to where to purchase another stock, the lack of funds notwithstanding.

The breakdown of the solar water heaters has had profound effects on other operations of the hospital. For example, the hospital has had to cut the provision of food to in-patients and supply of hot water in order to limit the use of firewood. Before the installation of water heaters, the hospital used to buy about 140 tons of firewood in order to heat enough water to meet the needs of the patients. Now they

have to buy between 47 tons and 70 tons of firewood per month. The price stands at between 200,000/- and 300,000/ per ton but the it fluctuates depending on the type of wood; if type of wood burns like rice straws or maize storks then the number of tons per month rises. Costs also rise when suppliers get the firewood far away from the hospital and during the rainy season when the road is muddy and slippery.

The breakdown of the solar water heaters has also brought inconveniences and additional burden to nurses working in the wards. A nurse at St. Joseph Ward (ward 47) Anna Mlay explained that following the collapse of the heaters they now have to collect hot water from the main kitchen, about 100mts away, in jerry cans so that patients can bath. This is not only cumbersome but it becomes an additional task over and above their daily cores. The problem is compounded when the number of in-patients rises. The ward usually admits 35 patients but sometimes the number rises to 47. As a result, the morale of staffs who work in the wards (nurses) has gone down and they lament this situation but there is nothing they can do about it. However Ms Mlay was quick to recall the good days when the solar heaters were functioning. She said that hot water was always available from the taps and patients who were not very ill could take a bath on their own, but now they have to wash them.

According to Dr. Kyejo, the hospital has no plans to look for funds for either purchasing spare parts to or buying new solar water heaters. He said maybe the Catholic Diocese would look for donors.

C: 2:2 LUGALA LUTHERAN HOSPITAL



Some of the offices for Lugala Lutheran Hospital, the Malinyi District Designate Hospital.

Lugala hospital was built in 1957 and later renovated and expanded in 1997. Located two kilometers outside the headquarters of Malinyi District and 360 from Morogoro, Lugala Hospital is owned by the Evangelical Lutheran Church in Tanzania.

Currently it is the Malinyi District Designated Hospital and provides office accommodation for the District medical Officer and the District Commissioner.

The hospital was provided with funding from UNDP through the Small Grants Programme amounting to 38,240,000/- for the purpose of rehabilitation and capacity expansion of a PV plant after solar generator was hit by lightning, forcing the hospital to turn to a diesel generator for its electricity.

The Dr. In-charge, Emmanuel Chogo, appreciated the support given by UNDP through the SGP for funding rehabilitation and capacity expansion of the hospital's solar plant, which has greatly improved the reliability and efficiency of electricity, thus improving the quality of service.

Following implementation of the project, the solar system provides electricity for all departments – operating theatre, labour room, maternity ward, pediatrics ward, the laboratory and the female and male wards. The X-ray unit is not connected to the solar system but uses electricity from a diesel generator. The unit is not connected to solar power because the use is not regular and the supply fluctuates. On the other hand electricity from the grid is not used because of frequent blackouts. The solar system also operates a solar water pump that supplies water from two wells as a result of which the hospital doesn't face water shortage.

However the capacity of the solar system has gone down because of few batteries are being used. A total of 24 batteries that were installed as part implementation of the project all collapsed and only 16 have been replaced so far. The others have not been replaced due to high costs. The solar panels are all in good order and working efficiently. Solar is important for regular, reliable and cheap electricity.

Yet demand for electricity has increased with the introduction of electronic internal communication that is meant to follow up and trace treatment of patients, supply of medicines and data collection. The new system has raised electricity consumption and thus costs, much as the hospital call collects accurate data on patients, drug movement and equipment allocation.

There has been an insignificant increase in the number of patients admitted to the hospital ranging between 100 and 140 from the previous range of 100 to 126. The number of outpatients has however increased to between 2,000 and 2,500 from the previous 1,000 to 1,500.

The use of solar electricity in the hospital has had a spillover effect as many members of the community around the hospital have installed solar electricity systems for lighting their homes. Awareness of solar electricity has become high since the implementation of the project, a significant realization of one of the goals of the project - to raise awareness of the use of solar electricity as renewable energy that is easily accessible, cheap and reliable. While at the inception of the project there was only one technician to oversee the operations of the solar system, now there are two; one of whom is an electrician and the other is an expert in solar energy.

There has also been significant reduction of CO₂ emissions as the hospital has cut down the use of the diesel generator. Currently the generator that supplies electricity to x-ray machines runs for two hours daily on 20 litres of diesel for 10 days. The price of diesel in Malinyi is about 2,300/- thus reducing the running costs of the hospital.

The hospital is also being expanded with the labour room being reconstructed to accommodate ten deliveries at once. There is also a new ward for premature babies, the Kangaroo room, which can accommodate four mothers and their babies. When the room gets into full use the consumption of electricity is set to rise.

C: 2:3 MAHENGE DISTRICT HOSPITAL, ULANGA DISTRICT



Some of the buildings that form part of Mahenge Hospital for Ulanga District. The hospital was built during the colonial era and serve as the district hospital for the then Ulanga District which has in recent years been split into two more districts of Kilombero and Malinyi. The two new districts are served by St. Francis Ifakara Referral Hospital and Lugala Lutheran Hospital respectively.

The hospital is Located in what used to be a remote area but now linked to Kilombero district with an earth road that is passable throughout the year. Some difficult and dangerous sections of the road have been built with tarmac. Before being connected to the national electricity grid the hospital used a diesel generator but even the supply had remained unreliable due to frequent blackouts. Tuesdays and Thursdays are “dark days” when electricity from the grid is cut off for at least 12 hours. There also intermittent and unannounced black outs during other days of the week. This situation was an impediment to the provision of quality medical services and a cause for low morale and frustration among hospital staff members.

The hospital has the capacity to admit 118 patients but there are only about 100 patients every day. A new ward is being built which will accommodate 39 patients. The number of outpatients ranges between 150 and 300 every day.

Electricity infrastructure for the grid system is dilapidated; it was installed in the 1970s hence there is lot of power leakage and wastage resulting in frequent change of bulbs. Replacement of the wiring system and related accessories for grid electricity supply is required.

In 2017 the hospital received a grant from UNDP through the Small Grants Programme that amounted to 110m/- to install a solar system that would increase availability and reliability of electricity. The end result was to increase the efficiency and quality of services offered by the hospital.

Implementation of the project has seen reliable electricity being supplied to maternity block, operating theatre, laboratory, labour room, children's ward and other wards. Special attention has been directed to women and children by supplying solar electricity to the maternity block which houses the maternity ward, labour room and labour theatre so that women and children can be attended to under the same roof.

Administration offices and the pharmacy unit still get their supply from the grid. The Grade One ward and the x-ray unit are also not supplied with solar electricity- the unit uses heavy machines that have high consumption of electricity which would overrun the installed solar capacity. Other places not supplied with solar electricity include the office of Dr In-charge, the DMOs Office and the reception.

Installation of the solar system has gone a long way towards saving lives. During operations or when women deliver in the labour room the automatic back up ensures that operations can still be conducted even when electricity from the grid fails.

According to the Dr. In-charge, Mihambo Aloyce Kapela, no patient has died when being operated on or being attended to, due to sudden black out since installation of the solar backup system. Formerly there were between five and six deaths a year on the operating table due to electricity failure. There was also an average of 20 children's deaths a year due to power cuts but so far there has been just one and for a different reason. The hospital also attends to an average of 1, 700 women a year who deliver at the hospital.

The hospital's Social Welfare Officer, Aziza Jafari, conceded that staff morale in theatre, laboratory, labour room, is now high because they can work efficiently without having interruptions from power cuts. While the many deaths that occurred before installation of the backup system made the public blame the

hospital for negligence, there are no blames now. The strained relationship between the hospital and the public has also been normalized.

To maintain sustainability of the solar system, the hospital has assigned to technicians to oversee its service and repair. One of the technicians is an employee of Ulanga District Council and the other is employed by the hospital. The Dr. In-charge has also been exposed to the basics of the solar system; this was done specifically to ensure the smooth running of the system.

There is need to compliment the grid electricity with the backup system in administration offices because this is where everything begins. This is the starting point of the “value chain “of efficient service delivery.

C: 2: 4 MBINGU CATHOLIC HEALTH CENTRE



The front view of Mbingu Catholic Health Centre. Also seen here is the Outpatient Department.

In 2012 the Health Centre received a grant of 75m/- from UNDP's Small Grants Programme in order to install solar electricity system and thus improve the quality of services at the Centre, which serve a community of about 3,000 people. The Centre admits 20 patients on average but the number rises up to 30 in extreme situations such as disease outbreaks. An average number of 30 outpatients are attended to at the centre every day. Sometimes the number rises up to 70. The Centre also employs 35 members of staff.

Prior to the implementation of the project, the centre used electricity from a diesel generator which, however, was unreliable and could not all the needs of the Centre. During the night staff members who were on duty used kerosene lamps. This reduced efficiency and quality of service while staff morale also diminished. Units like laboratory, provided services only during the day. There were also problems in keeping immunization drugs potent because the kerosene refrigerator was unreliable as temperatures were fluctuated.

The solar system that was installed 2013now supplies electricity to laboratory, pharmacy, admin offices and all the wards. According to the Dr. In-charge Sr. Virginia Mayala, the Centre can now handle almost all maternity cases and the complicated ones, which are rare, are referred to St Francis Referral Hospital in Ifakara, a distance of about 60 kms away. With reliable supply of electricity, operations are conducted smoothly and patients in the labour room and labour ward are attended to efficiently. Immunization services have improved greatly, with 574 children being vaccinated in 2018, up from 217 before installation of the solar electricity systems. The number of pregnant women who have been vaccinated has also gone up from 135 in 2013 to 201 in 2018.

Mr. Peter Malubalo who is in-charge of the vaccines room concede that following installation of the solar electricity there is no danger of the vaccines being spoiled because the reliable supply of electricity keeps the vaccine at required temperatures all the time. The use of kerosene refrigerators could not always guarantee stable temperatures.

In order to conduct smooth services, the Centre acquired funds from other sources to purchase and install a solar water pump. Another set of solar system was acquired for the blood bank. Since the machines consume a lot of electricity and the quality of blood must be maintained, it was imperative that the blood bank gets a separate source of electricity.

Now that there is regular supply of electricity day and night, staffs on night duty don't have to move about carrying kerosene lamps. Other sections don't have to work in semi-darkness and so offer poor quality service. With electricity in the wards, theatre, laboratory and other places, staff morale has increased and the quality of service has improved.

The Centre has also employed a technician, Mr. Daudi Israel who oversees the servicing of all solar electrical installations at the Centre.

On another note, Dr. Sr. Mayala said that community members around the Centre have also been inspired to adopt solar energy. No figures were available but number of houses with solar panels on roof tops could be seen.

C: 2:5 ST. FRANCIS REFERRAL HOSPITAL IFAKARA



The main entrance to St. Francis Referral Hospital, Ifakara

The Referral hospital is owned and managed by the Catholic Diocese of Ifakara but until recently it was under the Catholic Diocese of Mahenge. It was built by Catholic missionaries in the early 1930 and although in the latter years it was connected to the grid, electricity supply has been unreliable due to frequent power cuts. For many years the hospital has depended on diesel generators that are not only expensive to run but also produce CO₂ emissions.

In 2009 the hospital received a grant of 63m/- in order to carry out solar electrification of its buildings in order to improve services and reduce hospital running costs.

According to Mr. Godfrey Mkwiche, the hospital technician who was involved in the installations of the system, solar electricity was installed in the main theatre, two minor theatres, labour ward and pediatrics ward. The rest of the wards remained connected to the national grid and the generators as an alternative.

The theatres could thus operate smoothly for 24 hrs without interruption from power cuts. Patients in the labour and pediatrics wards were also could also be attended to efficiently because reliable electricity was available. For five years the grant from UNDP thus greatly improved the quality of service at the hospital and saved lives which would otherwise have been lost due to lack of reliable electricity.

However, beginning 2013 the hospital embarked on extensive rehabilitation of hospital buildings. This required pulling down the solar panels, the control panel and the solar buildings to pave way for the renovations to take place. The solar panels and the control panel have been kept safely in a store room while the batteries have long been rendered useless.

Currently the hospital runs on two diesel generators, a big one with capacity of 700lts of diesel and a small one with capacity of 100 lts of diesel. The big generator runs throughout the day when there is total power cut and the small one runs during the night, mainly to provide light. This brings to 400 lts the total consumption of diesel per week and translates to a fuel bill of about 1m/-. Likewise the hospital's electricity bill stands at 12m/- per month.

According to the Director General of the hospital Dr Fr. Wilfred Gingo, the hospital admits between 190 and 200 patients while 300 are attended to at the outpatient department. A total of 340 workers of various cadres are employed by the hospital.

According to the Director General, the rehabilitation of hospital buildings is set to be completed in September 2020 after which the solar system will be reinstated.

D: RECOMMENDATIONS



The maternity ward building at Mahenge Hospital

There are cases where UNDP seems to have unfinished jobs. The projects implemented need some kind of finishing touches in order for the recipients to enjoy full benefits of the grants. For Mahenge District Hospital, for example, connecting solar electricity to administration offices, the pharmacy, reception, the Grade A ward and other units that are still served by the grid would complete the installation of solar power for the whole hospital. As stated by one member of staff, the “treatment value chain” begins in the administration offices and culminates with services provision in the various units. Moreover all administration offices now use computers which require availability of reliable electricity in order to avoid loss of data when there are sudden black outs. It is recommended that UNDP thinks of financing the installation of solar electricity in the remaining areas of the hospital so as to further improve service delivery and the recipients enjoy the full benefits of the grant.

Considerations could also be made to support Lugala Lutheran Hospital, the Malinyi District Designate Hospital, who over the years had the 24 solar batteries nonfunctioning. They managed to purchase 16 batteries while eight are yet to be

bought due to lack of funds. Basing on technical expert advice and a request from the hospital, UNDP through SGP could think of providing funding for purchase of the batteries in order to boost the capacity of the electricity solar system.

The case of Huruma Hospital, the Designate Rombo District Hospital, seems to be different in the sense that it calls for a completely new project and not merely putting final touches to an existing one. Whatever assistance UNDP is likely to offer must be demand driven.

E: CONCLUSION



Part of the Outpatient Department at St. Francis Referral Hospital, Ifakara.

Generally all the solar powered projects supported by UNDP through the Small Grants Programme have had significant impact in terms service delivery and saving lives. With availability of reliable electricity, operations have been conducted smoothly and successfully, better equipment has been installed in laboratories and staff members have been motivated to give their all in providing quality services. A case in point is Mahenge District Hospital which has managed to significantly reduce deaths of adults and children. Another example is that of Mbingu Catholic Health centre where vaccination of mothers and their children has increased significantly. The number of pregnant women attending clinic and

delivering at the Health Centre has risen thanks to installation of solar electricity that has enable staff to perform better day and night.

On a different note, UNDP support has been some kind of a wakeup call for hospitals to strive to seek assistance from other organizations in order to meet their solar electricity needs. Mbingu Health Centre, for example, managed to get funding from other sources to install solar power for their blood bank and install solar water pump but it all started with support from the Small Grants Programme.

UNDP has thus helped Tanzania to shift towards the use of renewable, albeit slowly, in order to address energy poverty, raise the quality of lives of the poor and make the country attain sustainable development goals.

Signed:

Deodatus M. Mfugale