

MWANDI HOSPITAL

AMERICAN PARTNERS 2019 PROJECT REPORT

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With gratitude to our donors, the American Partners are pleased to submit a summary of the recently completed or on-going projects at the UCZ Mwandi Mission Hospital (UCZMMH). All of these projects were (are) funded by the generous contributions of many individuals and groups who are committed to supporting the mission of the Mwandi hospital.

The 2017 strategic plan established by the UCZMMH established ten-year goals for the Mwandi hospital, including transitioning the hospital to a specialty hospital with Level 2 status. Later that year, an implementation plan for the strategic plan was developed and approved by the hospital's local board. The implementation plan designated the American Partners as the major funder for the capital projects that will be needed to help the hospital to obtain Level 2 status.

At the international board meeting in Zambia last April, the board discussed the requirements for becoming a specialty training site and reinforced the goals necessary for achieving a Level 2 designation from the Health Professionals Council of Zambia. Many of the steps needed to achieve Level 2 status include upgrading and expanding the physical plant and obtaining specialty equipment for the hospital. The first steps addressing the hospital's physical plant were building a new incinerator for hospital waste and developing a new master plan. The master plan will develop a blueprint for the entire hospital compound including all facilities necessary for Level 2 status and the specialty services to be offered by the hospital.

The Mwandi hospital is also impacted by the many environmental and economic challenges currently facing all of Zambia. Inflation has increased costs of all goods including fuel, building materials, and food. Drought conditions and Zambia's enormous debt have resulted in rising costs of electricity and in lengthy and frequent power outages. The Kwacha has declined in value throughout 2019 and is now trading at 1 USD:14.6 ZMW.

The focus of the American Partner funded projects will achieve two goals: 1) Helping UCZ and the hospital administration achieve the goals of the 2017 strategic plan, and 2) Providing potential sources of income to mitigate limited governmental support, especially related to the provision of medicines, and the increasing costs of electricity, fuel, and food.

Four major projects were funded by the American Partners in 2018 & 2019. Each will be discussed on the following pages of this report.

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The New Incinerator

For many years, the Mwandu hospital did not have a functioning incinerator for disposal of medical waste. The old incinerator had deteriorated and the hospital lacked funds to repair it or construct a new incinerator. For health and safety reasons and to meet Level 2 hospital requirements, the American Partners agreed to construct a new incinerator in 2019. The new incinerator was completed and made available for hospital use in August 2019. A fence, constructed around the incinerator, further insures that the waste and the operation of the incinerator do not pose safety issues. The pictures below show construction of the fence and a view of the incinerator site after project completion.



The Master Plan

Developing a new master plan for the UCZMMH facilities is a necessary step toward achieving Level 2 status for the hospital. A master plan that will help us predict the health care needs of the Western Province of Zambia for the next 20 years and allow us to determine the most efficient and effective relationships for all functions of a Level 2 hospital. The plan will address which existing structures can be repurposed or remodeled and what new facilities need to be constructed. A completed master plan will also allow us to plan for additional solar power needs, as well as needs for other utilities or maintenance capabilities for supporting new hospital functions.

The American Partners are happy to report that we have engaged Paul Ndhlovu of PNA Architects Zambia to assist with the creation of the new master plan. He visited Mwandu on a number of occasions. During those visits, he interviewed many of the hospital staff and the local board to discuss their ideas for future hospital facility's needs. Mr. Ndhlovu also discussed the standards and regulations that must be incorporated into the plan with local authorities. Everyone is looking forward to reviewing the documents produced by Mr. Ndlovu in the new year.

The Water Project

When the UCZ Mwandu Mission Hospital's nurses and doctors don't have sufficient clean running water to wash hands between patients & before surgery, health suffers. Unfortunately, the Mwandu hospital water system was not able to provide sufficient clean water to meet the healthcare needs of its patients for many years.

Mwandu Hospital American Partners are happy to report the installation of a new water system is well underway. The excavation of the old reticulation system began in late May. The excavation revealed more problems with the old piping than anticipated. Many of the pipes that exposed during the excavation were redundant and leaking. The upgrade of the entire reticulation system began after the old piping was removed and new piping was in place by early fall. Interestingly we discovered that many of the old steel pipes that were replaced were first installed in 1930! So, it is not surprising that they weren't efficiently delivering the needed water to the hospital buildings.



Old water pipes showing blockage



Old water pipe that had been partially "mended"



Installing appropriately sized piping with secure connections

Four bulk tanks were purchased in South Africa and arrived in Mwandu in August. The four large reservoirs will soon be elevated at the river's edge on new steel pedestals.



While awaiting the delivery of the steel for the scaffolding, the site for the scaffolding to hold the tanks was prepared. First, an area next to the Zambezi River was cleared and holes were dug for concrete footings that will support the steel scaffolding. A platform at the top of the scaffolding will hold four water tanks. The tanks, when full, will have an estimated weight of 160 tons. To ensure the concrete base is capable of supporting the weight of four full water tanks, eight concrete columns supported by steel bar frames were buried at a depth of 2 meters. A 150mm (6-inch) thick concrete slab then connected all of the columns, providing stabilization and additional strength for the base. Both the concrete columns and the slab have been cured to reach their maximum strength.

The construction of the steel scaffolding will commence as soon as the materials arrive in Mwand. Once erected, the scaffolding will be topped by a steel platform and the tanks will be lifted to the platform using a crane. The tanks will be positioned for the best weight distribution and will be filled with water by a pump located at the river's edge. The pump will be able to fill the tanks in about 6 hours. The pumped water will be filtered for large particles before entering the tank and a UV filter will purify the water after it leaves the tanks and before it is delivered to the hospital.

If all goes well, the project will be completed by the end of January, 2020.

The Solar Project

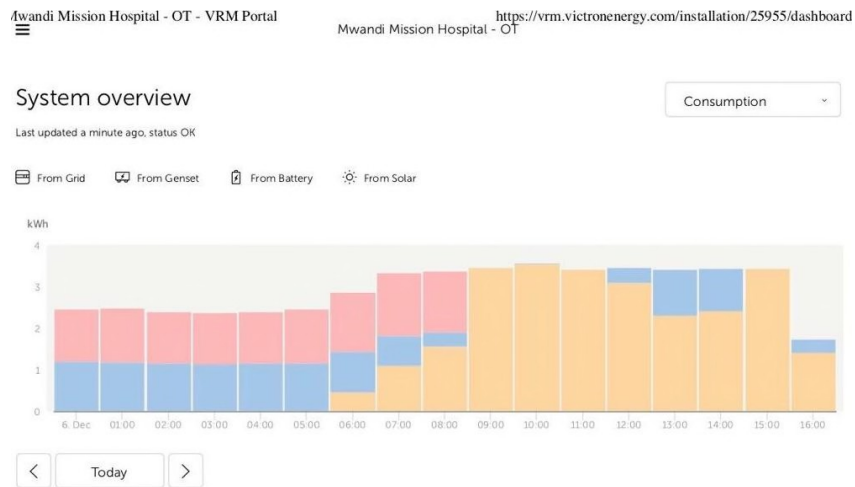
The 2019 drought in Zambia is the worst in 40 years. As a result, ZESCO is imposing mandatory power outages (up to 18 hours per day) in many areas of the country and is increasing its tariffs on electricity by 75-100%. Given recent history, Zambia's current environmental crisis will probably not be its last. For these reasons, the use of alternative sources of power is imperative, especially for healthcare institutions. During recent load-shedding, some hospitals have been limited to four hours of power each day. Thankfully, Because of the supplemental solar power, general care of ward patients has not been severely affected by ZESCO outages.

Phase I of the Mwand hospital's solar project was completed in 2018 with the installation of panels and batteries to supply power to the main hospital building (see pictures below).



The main building now gets 56% of its power from the solar system. Recent data gathered by the solar systems monitors are shown below. The graph below illustrates one day's consumption of power from each of three sources - solar panels (yellow), solar batteries (blue), and ZESCO (red). The solar power is generating enough power to supply the hospital building and recharge the batteries at the same time.

The success of Phase I demonstrates that solar power is a reliable alternative to hydroelectric power in Western Zambia. The hospital will now proceed with Phase II of the solar project so that patient care in all areas of the hospital will benefit.



The first step in Phase II of the solar project will begin in 2020. This step will add a second identical system to the Phase I system now supplying the main hospital building. By adding a duplicate system, the generated solar power will be doubled. With both the original and duplicate systems supplying solar power, 100% of the electricity needs of the main hospital building will be met.

Thereafter, a stepwise progression of the project will continue until solar power is supplied to the entire hospital compound. The solar engineers also predict that the completed solar project will produce more electricity than will be needed for hospital functions. The excess power may be used to power some equipment that can't be supported by solar generated power or it may be possible that ZESCO may be willing to buy the excess power from the hospital. If ZESCO agrees to buy any excess power produced by the solar system at the hospital, that income could be used to purchase drugs and other consumables that are now in short supply.

Completion of the solar power project for the hospitals' current facilities is projected for 2021. Ultimately, it is hoped that ZESCO power will serve only as back-up to the hospital-generated solar power and excess electricity will provide budget relieving income so the hospital can reach Level 2 facility status, serve more patients, and expand to include specialty services.