Case Study: Transition to Renewable Energy at Raleigh Fitkin Memorial Hospital (RFM), Eswatini

The onsite 1 MW PV Array at Raleigh Fitkin Memorial Hospital (RFM) Project (Image source: www.undp.org)

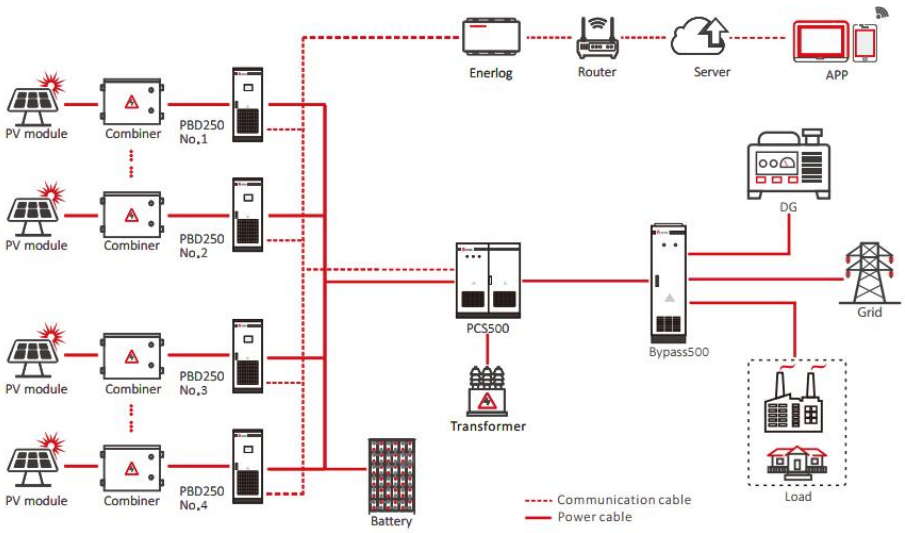
Introduction

In January 2024, Raleigh Fitkin Memorial (RFM) Hospital in Manzini, Eswatini, successfully completed the installation of a hybrid power station featuring ATESS energy storage system. It enhances the facility's ability to withstand load shedding and significantly reduces operational energy costs by 80%. This project aligns with Eswatini's vision for a sustainable energy future and showcases the transformative impact of renewable energy on healthcare infrastructure.

Project Overview

The RFM Hospital's energy transition is a milestone for the Kingdom of Eswatini, designed to reduce dependence on fossil fuels while ensuring continuous power supply for critical healthcare services. The newly installed energy system comprises:

- **1 MW Solar PV Array**: Supplies renewable energy to power the hospital's operations.
- **1 MWh ATESS Battery Storage System**: Ensures efficient backup storage and energy management.
- **4 x ATESS PBD250 Inverters**: Paired with the ATESS PCS to enable solar connection to the system.
- **ATESS PCS500 Battery Inverter:** Manage energy dispatch and enhance energy utilization during periods of peak demand or power disruptions.



System diagram

This hybrid energy solution not only ensures that RFM Hospital continues to operate during electricity disruptions but also significantly cuts down on the cost of electricity by utilizing renewable energy sources.

Working Principle

In the presence of a grid connection, during the day, the electricity generated by the photovoltaic system is first used to power the load. Any excess power is used to charge the battery. At night, the system prioritizes using the stored battery power to supply the load. If the battery capacity is insufficient, the grid supplements the extra power demand.

In the event of a grid outage, the system will prioritize using the battery to supply the load. When the battery discharges to its cutoff state of charge (SOC), the inverter signals to start the generator, and the system switches to generator power for the load. Once the battery is fully charged, the inverter sends a signal to shut down the generator, and the system will continue to use the battery to supply the load.

ATESS PCS500 energy storage system installed for RFM project

Reducing Carbon Footprint and Energy Costs

The project aims to significantly reduce the hospital's environmental impact by replacing outdated coal-powered systems with renewable energy alternatives. For instance, the old coal-powered boiler, which had been used to generate steam for various hospital processes, has been replaced with a solar-powered electric boiler. Additionally, older energy-intensive appliances, such as the washing machines and tumble dryers, are being upgraded to energy-efficient models.

RFM Hospital previously consumed 35 tonnes of coal every four months to power these systems. In addition, the lighting and air conditioning systems are being upgraded to energy-efficient versions. This shift is expected to reduce the hospital's electricity bill by 70%.

By transitioning to solar power, the hospital will save approximately 536 tonnes of CO_2 emissions annually, which is equivalent to removing 125 cars from the road for a year. This reduction in carbon emissions is a significant step toward Eswatini's climate goals and the global fight against climate change.

ATESS South Africa After-sales Technical Support Engineer stands around this project's BESS Containers

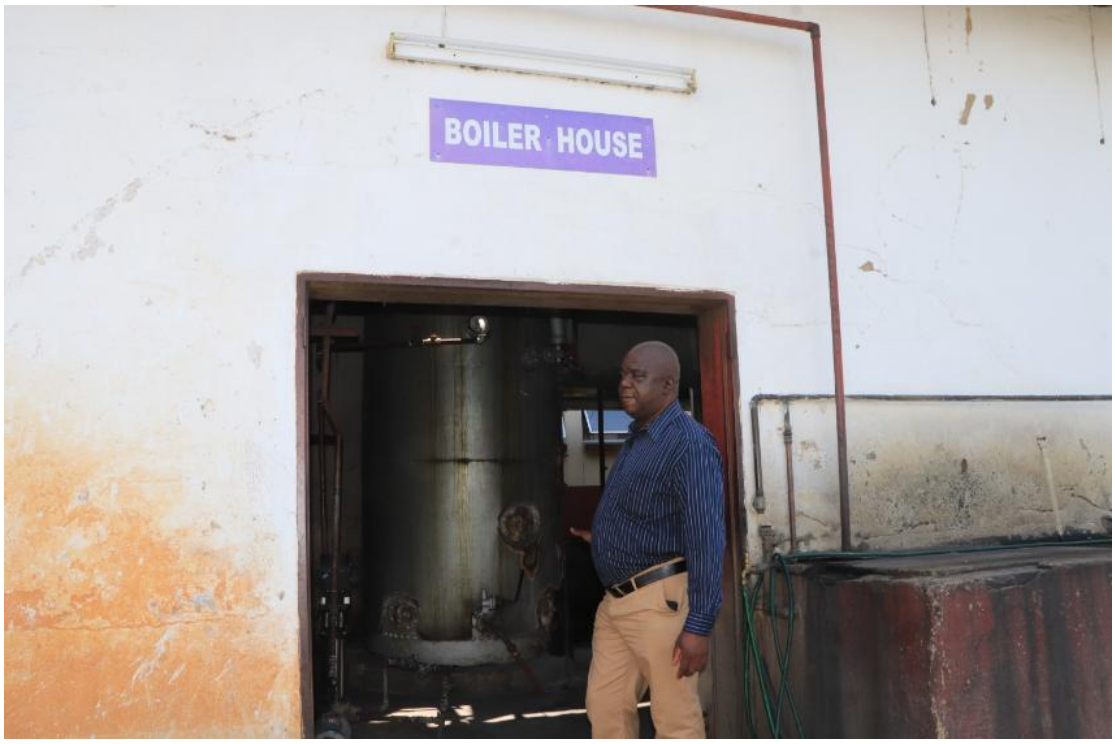
Government and International Support

The Greening the RFM Project, funded by the Italian Government and supported by the United Nations Development Programme (UNDP), is a key component of Eswatini's broader energy strategy. The project's goal is to provide a scalable model for other public and private institutions in the country, demonstrating the benefits of renewable energy adoption in healthcare.

Eswatini's Energy Master Plan 2034 aims for a 50% renewable energy share in its electricity mix by 2030. With over 80% of the country already electrified, the focus is on reducing the reliance on imported, coal-based energy, which currently meets approximately 70% of the country's electricity demand. This transition aligns with Eswatini's ambitious climate goals, which include increasing renewable energy adoption and reducing the environmental footprint of energy production.

Economic Impact and Savings

Beyond the environmental benefits, the RFM Hospital project also promises substantial cost savings. Once fully operational, the hybrid system will reduce the hospital's energy consumption by 80%, leading to an annual saving of approximately USD 176,714. These savings will be reinvested into the hospital's operations, helping to improve healthcare services, purchase advanced medical equipment, and reduce the need for patient referrals to international health facilities due to a lack of necessary equipment.



RFM Hospital Administrator, Mr. Leonard Dlamini, showing the coal-powered boiler house (Image source: www.undp.org)

Mr. Leonard Dlamini, the Administrator of RFM Hospital, emphasized the potential of these savings to improve patient care: “With the savings, we will enhance the hospital’s services, for example, by purchasing tools for surgeons to reduce the need for patients to be transferred to health facilities outside the country.”

A Model for the Future

The RFM Hospital project is not only a success for the hospital but also a model for future renewable energy transitions across Eswatini and beyond. The hybrid solar energy system at RFM Hospital will serve as a demonstration project for other institutions, showing the benefits of renewable energy in reducing operational costs and improving service reliability.

Through site visits, workshops, and public awareness campaigns, the results of the project will be shared with local communities, government bodies, and the private sector to promote broader adoption of renewable energy solutions. The project also

aligns with the UN's Sustainable Development Goal 7 (SDG 7), aiming to ensure access to affordable, reliable, sustainable, and modern energy for all.

Conclusion

The Greening the Raleigh Fitkin Memorial Hospital project is a significant achievement in Eswatini's journey toward renewable energy adoption. ATESS is proud to have contributed to this transformative project by providing advanced solar energy and energy storage solutions that ensure reliable power for critical healthcare services while reducing the hospital's environmental footprint and operational costs. This collaboration showcases the potential of renewable energy to create a more sustainable and resilient healthcare system, setting the stage for further advancements in energy efficiency and sustainability in Eswatini and beyond.

ATESS looks forward to supporting more projects like the RFM Hospital and continuing to provide innovative solutions to institutions in Eswatini and across Africa. As the country moves toward its renewable energy goals, ATESS remains committed to delivering cutting-edge technologies that contribute to a greener, more sustainable future for all.

Reference link:

https://www.undp.org/eswatini/news/solarising-rfm-hospital-people-and-planet

https://www.undp.org/eswatini/news/prime-minister-commissions-solar-plant-hospital-energy-supply