



SOLAR POWERED WATER PUMP IN UMUODE VILLAGE, NIGERIA PROJECT CLOSE OUT SUMMARY



EXECUTIVE SUMMARY

This report details the implementation of a solar-powered water pump initiative at a school in Umuode village, Abia State, Nigeria. Building on a previous successful installation in a neighboring state, the project aimed to achieve several objectives:

1. Meet the school's water needs and provide a community water collection point,
2. Reduce operational costs associated with water pumping,
3. Transition to an environmentally sustainable solution, and
4. Demonstrate and promote green technology to students, their families, and the local community

The project successfully implemented a highly efficient, variable-speed Grundfos solar-powered pump that is meeting the school's water needs and providing a water collection point for the local community. Excess funds were used to purchase a lithium storage battery for use with solar panels to improve lighting and power a variety of electronic devices

BACKGROUND

SCHOOL OVERVIEW

The school is one of the most affordable in the area and the only institution accredited by the West African Examination Council (WAEC) to administer government exams. It serves 700 elementary and secondary students and offers seasonal programs for local women on farming and poultry raising.

THE SCHOOL'S WATER SYSTEM

Prior to the project, the school relied on a diesel-powered pump to extract water from a depth of 200 feet. As water is used for fish farming, gardening, and general operations, the school's daily water consumption is up to 2,000 liters. While the area has an electrical grid, its unreliability and frequent power fluctuations made it unsuitable for operating the water pump. Consequently, the school was relying on a diesel generator to power the pump, resulting in and incurring escalating operational costs.

The annual expenses for running the diesel-powered water system amounted to approximately \$5,000 USD, as it used about 300 liters of diesel per month at \$2.00 USD per liter and required an additional \$100 USD for yearly maintenance.



LOCATION AND DEMOGRAPHICS

The school is in Umuode village, Osisioma Local Government Area (LGA), on the outskirts of Aba city in Abia State, southeastern Nigeria. Osisioma LGA spans 198 square kilometers and has a population exceeding 170,000, primarily comprising members of the Ngwa sub-division of the Igbo ethnic group. Umuode village itself has approximately 10,000 residents.

CLIMATE

The area experiences a four-month rainy season with annual rainfall of about 94 inches, leading to muddy roads and travel difficulties. The rest of the year is characterized by hot and dry weather, presenting cooling challenges.

PARTNERSHIPS AND COLLABORATIONS

From January to March 2023, we had the privilege of collaborating with Aiden, Laura, and Maxie from Camosun College as part of their MarComms 420 class. Their involvement included nearly weekly meetings to assist us in developing promotional materials, such as the Solar Smart Nigeria Facebook page. The partnership culminated in an event at the Interurban campus in March 2023, which highlighted various ICO initiatives.

The collaboration with Camosun College students helped focus our fundraising efforts and establish a social media presence as well as providing some publicity around sustainable practices and technologies.

PROJECT IMPLEMENTATION

TIMELINE

The project was approved as an ICO initiative in October 2022. Most of the required fundraising took place over the course of 2023 and the project culminated in the installation of the solar-powered pump on March 11th, 2024. A new lithium storage battery purchased with remaining funds was installed and operational on September 19th, 2024.

FINANCIAL OVERVIEW

The project was completed for less than originally projected due to favorable currency exchange rates, with the final cost being \$3,157.51 for purchase, transportation, and installation of the solar powered water pump. The anticipated annual savings from eliminating the use of the diesel generator are approximately \$5,000 USD, making a very compelling case for this exemplary transition to sustainable technologies.

CONCLUSION

Despite a significant increase in the cost of the pump and solar panels during the project timeline, a favorable shift in currency exchange rates allowed for the completion of the purchase, transportation, and installation well under budget at \$3,157.51. The timing of the initiative was quite fortuitous given Nigeria's recent "skyrocketing" diesel prices, which have increased more than fivefold since 2018 (from 250 Naira per liter to over 1,350 Naira per liter in 2024). This rapid rise in fuel costs further strengthened the business case for the project.



The solar-powered pump system is projected to have a lifespan of at least 25 years. Over this period, the savings from eliminating diesel consumption are expected to more than offset the future costs of replacing the pump and/or solar panels when necessary. With the implementation now complete, the school has assumed responsibility for funding and coordinating the ongoing maintenance of the well, pump, and solar panels.



Surplus funds from the project were allocated towards the purchase of a lithium storage battery. This addition restores the school's existing solar infrastructure to an operational state, allowing solar energy to be used to power classroom, hallway, and washroom lights during periods of limited sunlight as well as to operate biology lab microscopes and charge electronic devices.



We remain very impressed with the Grundfos as a company and with the quality of their solar powered pumping solutions. This project not only addressed the immediate need for a sustainable water supply but also serves as a practical demonstration of renewable energy technology for students and the local community.

We want to share our gratitude for all who contributed to making this project a reality. Bona, the school staff, and the students also wish to express their sincere appreciation for the positive impact this initiative will have on an ongoing basis.

FUTURE RECOMMENDATIONS

We hope that this successful implementation may serve as a model for projects in regions with similar conditions, potentially catalyzing a broader adoption of sustainable technologies in educational institutions and rural communities. We also feel there may be value in exploring funding models to help catalyze the ongoing adoption of solar powered pumps in other local schools and/or help facilitate the adoption of similar systems in other regions without being dependent on ongoing fundraising efforts.

ACKNOWLEDGMENTS

We would like to extend our sincere gratitude to those who've contributed to this project, the Camosun College students who helped us along the way and to the many ICO volunteers that allow the organization to continue facilitating so many highly worthwhile initiatives. We'd also like to recognize Bona and the school staff for the significant and ongoing investment they are making in the lives of students through the ongoing work of the school.