Kitario Solar Array
Kellerman Foundation

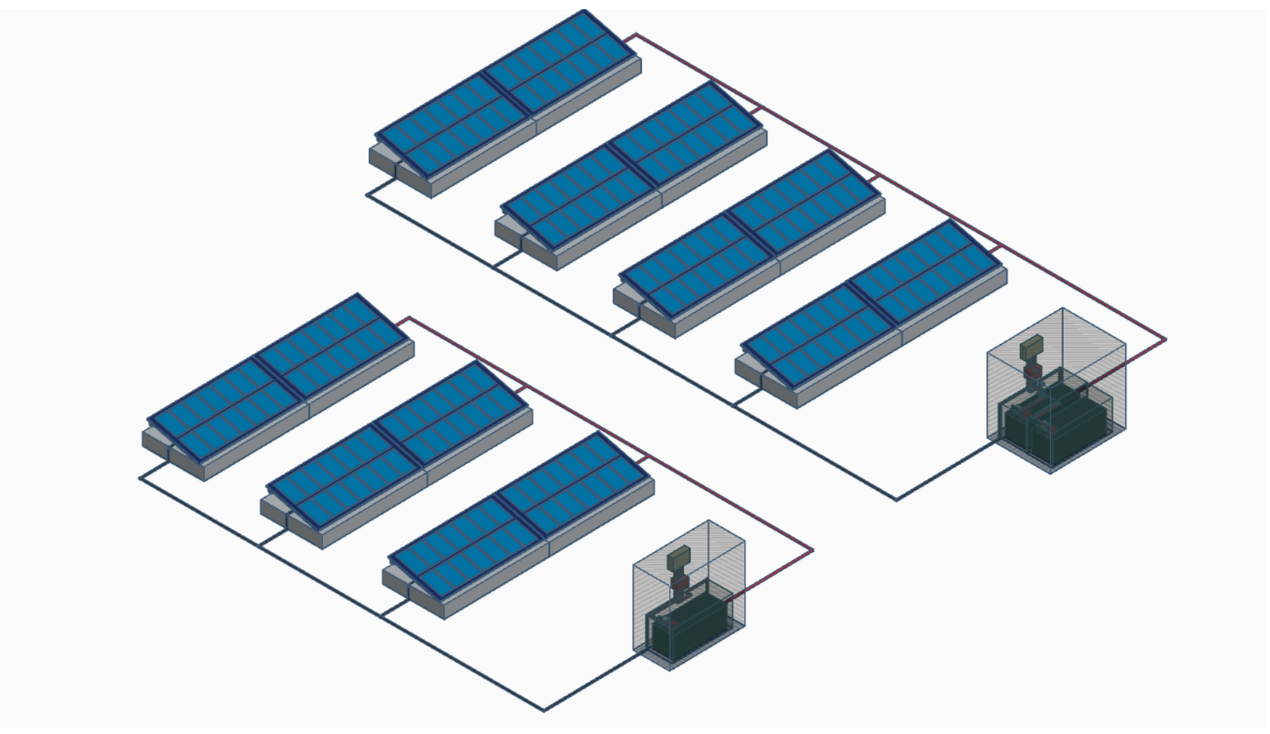
Diego Malagon (EE), John Nguyen (EE), Jerin Prasad (CE), David Rosales (CE),
Sebastian Hernandez (BME), Suyesh Shrestha (CS), Sowanate Amachree (ME)

Fall 2024

The Kellermann Foundation

- A Christian non-profit organization founded in 2004 by Dr. Scott and Carol Kellermann

Mission
- To support Ugana's most vulnerable communities by providing essential healthcare, education and economic development.



Problem Description

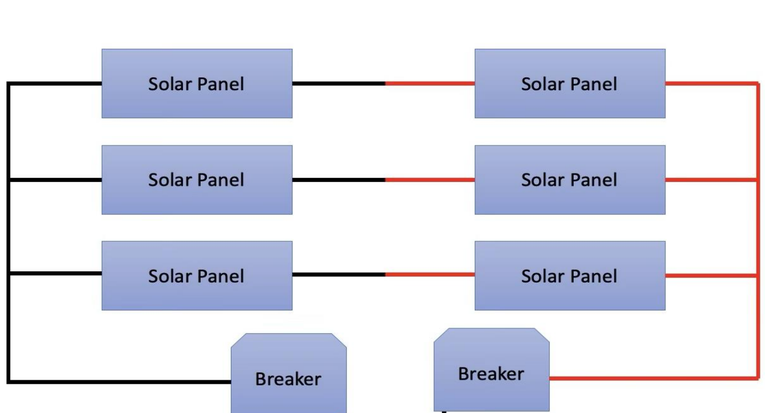
Lack of Easy Access to Water
- The Kitario Settlement lacks infrastructure to provide readily available water to its residents

Excessive Time and Effort Required to Fetch Water
- Residents currently spend a disproportionate amount of time and energy collecting water from distant or inconsistent sources.

Inadequate Water Supply for a Growing Population
- Existing solutions are insufficient to meet the community's demand

Constant Flow Rate
- Should be fluctuating during wet and dry seasons
- Obstruction of pipes

Irregular Annual Precipitation
- 6 month of dry season in a year where residents have to depend on unreliable water sources



Semester Accomplishments

Project Status at Start of Semester
- The Kellerman Foundation provided us with an initial plan for transferring water from spring boxes to the Kitario Village
- Data Provided
  - Village population size
  - Daily water requirements
  - Distance from village to water sources
  - Local weather and climate patterns

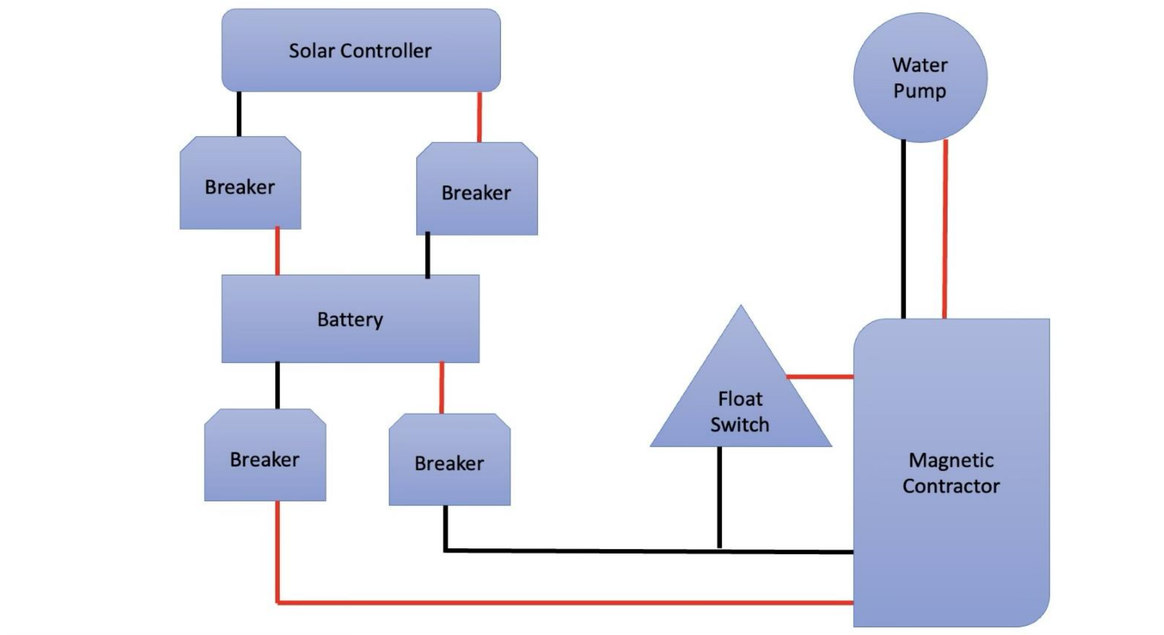
Key Accomplishments
- Identified optimal sunlight hours for the region
- Derived sunlight functions to optimize panel angles and timing
- Designed a 3D model visual oof solar array
- Curated cost estimates for construction
- Calculated power usage for solar array

Future Work

Improvements Model & Scaling
- Improve the 3D model visual of the solar array.
- Monitor our chosen solar panels and batteries remain the best products for the project.
- Research multiple float switches that work best with the chosen water pumps.

Fact Check Information

Calculate a more accurate cost review
- Find more accurate data of how Kitario settlement functions



Impact

The Kitario Solar Array Project
- Provide consistent water supply,
- Improve daily life, agriculture, and public health
- fostering long-term well-being, resilience, and sustainable development for the Kitario community

Solar-Powered Water Pumping System
- provide a steady, reliable water flow to Kitario Settlement
- leveraging renewable energy
- reduces operational costs and promotes sustainability.
- low-maintenance and user-friendly