**LAGI 2025 Fiji – HERPOLITHA WEBERI**

1. **Concept Narrative**

Our concept draws inspiration from Herpolitha Weberi, a species of hard coral of the family Fungiidae native to the waters of Fiji. It serves both as a visual enclosure and the main structural element for the design. The structures, modeled after this unique creature, create dynamic and inviting paths that frame a center garden, transforming the infrastructure into a meeting point, a place of learning, recreation, and community bonding.

The solar panels mimic the shape of the traditional Fijian Drua sails. These pixelated sails race through the landscape, creating waves on the Weberi’s structure. Their east-west displaced organization opens the landscape, welcoming the visitor. The sails point their tips to the center, crowning the elliptical garden. The center garden can be kept wild, used as an agricultural plot, or as a meeting/play area.

The open eye shape of the landscape start at the mountain’s watershed and channels it to the village, this is not only to poetically acknowledge the connection between the natural resources and the life of the village, but it is also thought as a possible water collection point that could make use of the installed water filters and tanks and subsequently provide the village with water.

The piece is made of a continuous spiral of pentagons of different dimensions supporting the ‘Sails’ (solar panel arrays). The spiral adapts to the panels' shape and ideal solar-gain angle, creating at the same time a walkable pathway under the protective shadows of the sails.

The Weberi structure is built using galvanized 500mm pipes that connect via standard threaded joints. The vertices of the structure are short, bent in situ, pipes that connect to the straight pipes of different lengths to create the pentagons. The spiral nature of the structure gives it stability during construction, and a series of longitudinal pipes connected to the vertices further strengthens the frame. The bottom pipes of the spirals are weighed with the water filters, tanks, and the dirt and rocks that cover them anchoring them to the ground without resorting to concrete foundations, allowing for a zero-impact deconstruction, and less material transport.

The batteries and inverters are hung under the solar sails, providing easy maintenance access (with a ladder) while keeping them out of reach of children and animals. The solar panels also serve as a rain protection for the equipment.

Weberi’s future installations can adopt the same principles while adapting their form to the new terrain, size, shape, orientation, and performance needs, just as a Coral like Herpolitha Weberi does, symbolizing the diversity and adaptability of nature.

1. **Technical Narrative**

**Technology**

Our design incorporates standard silicon photovoltaic (PV) panels, modular inverters, a battery storage system, and a rainwater harvesting, filtration, and disinfection system.

• Standard silicon solar panels were chosen due to their technological maturity, affordability, widespread availability, and ease of replacement. They are mounted on a structure designed to also collect rainwater.

• Modular inverters (8 kW each) allow the energy system to be scalable and easier to maintain. The total installed PV capacity is 94 kW.

• A 120 kWh battery storage system ensures electricity availability for 14 hours overnight, assuming a constant 14 kW load.

• A rainwater collection system captures rainfall from the surface of the solar panels (420 m²). Water is directed via channels and tubing to a simple, locally serviceable rock and sand filtration system.

• Filtered water is stored in tanks under each module, adding to a 100 m³ reservoir. The water can be pumped into a 10 m³ potabilization tank, where it passes through a fine (5 micron) filter and a UV disinfection unit. Optional chlorine pellets may be used to ensure water safety.

**Generation**

• Energy:

The PV system generates approximately 140,000 kWh/year, based on an estimated 4.1 peak sun hours/day typical for Fiji.

Energy not used immediately is stored in the 120 kWh battery system, providing critical power during nighttime and low-sunlight conditions.

• Water:

The annual rainfall in the area is 1595 mm. With 420 m² of collection surface, this results in approximately 670 m³ of water collected per year.

The village of Marou has 67 houses with an average of 4 people per household, totaling 268 people.

With an average consumption of 220 liters/person/day, the daily demand is around 59 m³/day, meaning the harvested rainwater could meet community needs for about 11 days annually without complementary sources.

The largest single-day rainfall recorded is 200 mm (84 m³ collected), so the 100 m³ tank is adequate for peak rainfall events.

**Inputs:**

o Solar energy

o Precipitation (rainwater)

**Outputs:**

o 94 kW of electrical power capacity

o 120 kWh of battery storage

o Up to 100 m³ of stored and filtered rainwater

o Up to 10 m³ of potable water ready for consumption

1. **Prototyping and Pilot Implementation Statement**

Our team will begin with a small-scale prototype at a community building, using 6 kW of solar panels, one inverter module, and a scaled-down water filtration system. This will allow us to validate system performance, water quality, and community engagement strategies.

We will work closely with local leaders, technical workers, and youth organizations in Marou to co-design, test, and monitor the system. This includes hosting training workshops, involving locals in the installation process, and adapting technologies based on local resources and user feedback. Once validated, the full-scale system will be deployed incrementally, allowing continuous learning and adaptation. The prototype will be dismantled and reused as part of the final full-scale system.

1. **Operations and Maintenance Statement**

The system is designed for long-term simplicity and community ownership.

• Solar panels and electrical components will require minimal maintenance, primarily cleaning and occasional inverter checks.

The modular nature of the piece means that components can be serviced without interrupting or affecting the performance of the others.

The structure requires minimal checks for loosened nuts and bolts. In case of damage, any part of the structure can be easily replaced without affecting the rest.

• The water filtration system uses passive gravel and sand filters, which can be cleaned by trained community members.

• UV lamps will be monitored monthly and replaced annually or as needed.

• Chlorine pellets will be added by a designated local health or water team.

We will establish a community water and energy committee responsible for routine inspections, supported by annual visits from technical advisors. Training materials and manuals will be provided in local languages, and local technicians will be identified for ongoing support.

1. **Environmental Impact Assessment**

The installation is designed to have minimal negative impact on local ecosystems.

• Solar arrays are ground-mounted in cleared areas, avoiding deforestation or habitat disruption.

• Rainwater harvesting reduces dependency on natural aquifers and minimizes erosion caused by runoff.

• The filtration system uses natural materials (gravel, sand, and UV light), avoiding chemical contamination.

• No greywater or contaminated water is discharged into the environment.

• All the materials used for the structure are reusable and recyclable. At the end of the system’s life, the structure can be dismantled, and the pipes can be reused to build other structures or as regular water pipes.

No special foundations are required, just local dirt and stones. Leaving no trace in the environment if the piece is moved, adapted, or completely removed.

Mitigation steps include:

• Monitoring soil erosion near the installation

• Ensuring battery systems are housed in leak-proof, ventilated enclosures with end-of-life recycling plans

• Training the community on environmental stewardship related to the system

Thank you!