1. Concept Narrative

- **Discuss design concept, visitor and community experience, co-benefits, shared land uses, materials, and any other important aspects of your design.**

We have developed a practical design solution that meets the needs of the village of Marou and aligns with Fiji's national 21st century development goals. Our solution establishes an electrical grid robust enough to generate and store electricity and collect rainwater over the course of a year for the village of Marou on Nativi Island in Fiji.

Designed to meld into the environment, our design concept is rooted in the natural flora of the island. It reflects elements of nature in both its purpose and appearance, aiming to blend into the landscape with minimal visual disruption. The pavilion organically integrates the energy collection and water harvesting systems.

Five large palm leaf-like structures are arranged in a circle, surrounding and supporting a flat, circular roof, forming a pavilion that is approximately three (3) meters in height by 10.5 meters diameter, creating approximately 85 square meters of shaded space for recreation, fellowship, and outdoor education.

Just as a leaf generates its energy through the absorption of sunlight, Photovoltaic Thin-Film Non-Silicon solar panels are installed on the structure, generating constant, reliable energy that flows to the homes and establishments of the village, while storing excess energy in a battery.

The foundation of each leaf is a prefabricated stainless steel frame, forming the channels through which rainwater flows. Between each channel is space that holds a framed, colored, semi-transparent panel, forming a solid structure.

To meet the amount of energy required for the project, at least four (4) pavilions will be established across the site, placed according to the instruction of the Marou villagers. The site layout will be determined by the villagers and will include designated space for agriculture, food storage, gathering and performance, play and discovery. A pavilion may also be installed near the school.

The leaves are built on a slab foundation with a 2% grade, sloping conically to a central drain. As rainwater falls on the structure and is funneled down to the ground, it will flow into the central drain and be collected in an underground tank. Five (5) 3-meter-tall, .15 diameter pillars support the tops of the leaves, creating a ring within the pavilion.

2. Technical Narrative

- **What technologies does your design incorporate? Why did you choose them?**

  The frames creating the leaves are prefabricated, shaped to mimic the petiole and rachis of a palm fan. Between each frame is space for an acrylic or glass panel to be installed, creating interesting highlights and shadows that move throughout the day.

  The solar technology chosen is Photovoltaic Thin-Film Non-Silicon.

  Materials for one pavilion

10.5 meter circular slab foundation	Concrete
Leaf frames	Stainless steel
Leaf panels	Prefabricated semi-transparent panels
Wooden columns	(1) 6 x 6 center support (5) 4 x 4 columns
Solar panels	Photovoltaic Thin-Film Non-Silicon

- **What are the system inputs? What are the system outputs?**

  System Inputs

  Once installed, the system does not require any inputs other than sunlight, rain, and maintenance.

  System Outputs

  Once established, the system will generate 75 kW of energy and store 7,570 liters of water.

3. Prototyping and Pilot Implementation Statement

- **How will your team approach the prototyping process and full-scale pilot implementation process and how will you collaborate with local community in both of those efforts?**

  We will provide detailed plans showing how to build the pavilions; members of the local community will work with engineers to build the four pavilions. Depending on the

abilities of the local community, the leaves may be fabricated at the site. In addition to concrete, materials to build the leaves may be shipped to the island.

We will work with the local community to source the needed wood.

The steel leaf frames, aluminum ring, and aluminum brackets, steel drain cap, solar panel systems, and water tanks will be shipped to the island.

4. Operations and Maintenance Statement

- **How will your design be operated and maintained during its life? How will the local community contribute to operations and maintenance?**

The solar panel system will require regular maintenance at a level like most commercial solar generation systems. Solar panels must be kept clean and free of debris. They should be inspected regularly to ensure the system is operating normally. With regular maintenance, most solar panels should last 25 to 30 years.

The water collection system will require general, regular maintenance such as clearing drains and filters, and repairs as needed.

5. Environmental Impact Assessment

- **What effects might your installation have on natural ecosystems and what steps can be taken to mitigate any foreseeable issues?**

Every effort will be made to minimize disruption to the ecosystem. Large holes must be dug to create the location of the tank, and to lay the concrete foundation.

While some materials will be shipped in, we intend to minimize transport by using local resources and materials.