Navigating Light, Holding Rain

LAGI 2025 Competition

**Concept Narrative**

Our proposal “*Navigating Light, Holding Rain*” creates a cultural monument that celebrates tradition and deep knowledge of sailing and navigation that empowered Indigenous Fijians to traverse and trade across the Pacific Ocean from their island homes. Inspired by the ceremonial ritual of *Yaqona* (Kava), where chiefs welcome guests by offering a communal drink, the design metaphorically extends this gesture of hospitality to visitors, climate, and landscape.

At the heart of the project is a modular solar structure, an ellpsoidal “sail on a mast” made of Monocrystalline Silicon photovoltaic panels. These modular “sails” form a constellation across the stie, serving as both renewable energy sources and sculptural landmarks. Each unit collects sunlight and rainwater, and its mast structure discreetly channels rain into the integrated gutter system, delivering water to a network of terraced retention ponds below. The geometry of the sail references traditional canoe rigs and contemporary minimalism, preserving the cultural integrity while allowing local fabrication and ease of maintenance.

We propose to rehabilitate the existing dam and reservoir above Marou Village for the twin purpose of a pumped-storage hydroelectric plant and as a retention basin to store water during the rainy season for use during the dry season. A new set of retention ponds, gently terraced along the valley site, will serve as both ecological infrastructure and community space. These ponds will collect runoff, support native planting, and regulate seasonal water cycles, addressing both drought and flood resilience.

The project’s material palette centers on durable, locally viable solutions: geotextile-lined ponds, galvanized steel structures, and native plantings. PV sail modules can be deployed at varying scales for household, civic, or communal use. This flexibility supports phased implementation and potential community co-ownership.

The visitor and community experience unfolds as a journey through water and light. The serpentine pathway leads users through the landscape, with each pond and sail acting as a place of reflection, play, conversation, or ceremony. At night, integrated LED elements subtly illuminate the sail edges and poles, revealing the cut lines inspired by celestial navigation and island silhouettes.

Most importantly, this project creates an identity anchor for Marou Village. While the community is deeply connected to its traditions and generous in its openness, it currently lacks a spatial monument that articulates its cultural narrative. Our design addresses this by embedding sustainable energy infrastructure within a landscape of ritual, education, and celebration. By uniting clean power, water resilience, and cultural storytelling, the installation not only supports the village’s practical needs but elevates the everyday into something extraordinary—welcoming all who arrive by land or sea. The system becomes a cultural landmark, visible across the terrain, honoring the past while signaling a regenerative future.

**Technical Narrative**

Our design incorporates monocrystalline photovoltaic solar cells, for their proven functioning, relatively high efficiency, and durability over time and variation in temperature. We combine the solar power generation with pumped storage hydroelectricity, turning both the renovated upper reservoir and new lower ponds on the project site into water-as-battery for our sustainable energy system. Pumped storage, based on the existing dam, is both sustainable and also respects and celebrates the past choices of the village.

Our PV array generates 200 watts/sq m over 700 sq m, delivering 140 kW nameplate power, roughly 2 kW per Marou resident. The village gets an average of 5.4 Peak Sun Hours per day over the year.

The upper storage pond has an area of 1000 sq m, a catchment area of 2500 sq m, and a storage capacity of 3000 kiloliters (kl).

The lower storage ponds have an area of 2000 sq m, a catchment area of 2500 sq m, and a storage capacity of 4000 kl. We plan to fill them only up to 3500 kl.

At an average annual rainfall of 1.6 m, we collect 5000 sq m x 1.6 m = 8000 m^3 = 8000 kl of water per year

We have 1000 kl of water available for pumped storage, with a height differential of 50 m between the upper and lower reservoirs, keeping a reserve of 100 kl in the reservoirs at all times.

The system inputs are sunlight, direct rainfall, runoff water, and gravitational forces

The outputs are electric power and stored rainwater.

**Prototyping and Pilot Implementation Statement**

We will research the availability of materials and methods in Fiji, and use that to inform our design so that we make the greatest possible use of local supplies and labor. We will engage with residents of Fiji and Marou in particular to get their input on what can be used and done locally. Items like the photovoltaic cells, LED lights, steel, and the reversible pump/generator will need to be procured elsewhere and shipped to the site. We will design the PV sail structures in our home country, and experiment with fabrication techniques and materials here, testing a small working prototype before committing resources to a full-size PV sail module. We will then finalize our design and then fabricating or ordering those elements which must be shipped to Marou.

We will work with the villagers to employ as many of them as possible in our prototype construction and testing efforts, and to get their input into the construction and evaluation plan. We will ask the village authorities to review our prototyping plan. We will make several prototype PV sails, one at full size and several smaller modules that interested, committed villagers can set up at their homes to test out and report back on.

**Operations and Maintenance Statement**

Based on the collective experience with the prototypes, both their construction and testing, we will work with the villagers to develop a plan for the construction, commissioning, and operation and maintenance of the full installation. The PV technology has been selected for its durability, and the PV sails will be structurally designed to withstand Category 5 winds. The design of the sails will be modular, so that if one fails, a replacement may be easily substituted while the faulty element is repaired. The PV and electrical system will require standard maintenance over their service life, like any power generation system, and we will train local people to carry out these tasks. The reservoirs and pumped-storage component will require greater ongoing maintenance, and after identifying local individuals who wish to take on the job, we will bring in outsiders with experience in these tasks to train the selected residents in maintenance and operation of the pumps and water system. We will establish connections between the responsible villagers and pumped-storage and PV operators elsewhere in the Pacific (Australia, Japan, etc.) for the exchange of knowledge and to develop a support network for this propagation of sustainable technology to Marou.

**Environmental Impact Assessment**

Our installation will require extensive earthmoving on the site to create the lower retention ponds, as well as for installation of the pipeline between these ponds, the pumping/generation station, and the renovated dam up in the hills. We will need to investigate any possible effects on the local water table of this excavation, and modify our plans accordingly. Similarly, we’ll need to survey the site for the existing animal population and ensure that alternate habitats are available as the landscape alterations are made. The proposed installation includes LED lights along the edges of the PV sails, and this will be controllable from the base station, in case the villagers want to limit the use of the new light source.