**MAROU** THE POWER OF COMMUNITY

**Concept Narrative**

*Marou: The Power of Community trying* to responds to the environmental, logistical, and infrastructural challenges of Marou Village on Naviti Island. The project combines traditional construction methods, local materials, and low-impact renewable technologies to create a multifunctional site where energy, water, food, and waste systems work together in a regenerative cycle.

The three central Energy Towers (architectural elements inspired by traditional Fijian Bure Kalou and sailing vessels) are designed for solar energy production and water collection. Their north-facing facades carry solar panels, while the outer structure is covered with mesh to harvest both rain and fog. Collected water flows into filtration systems and is stored for drinking, irrigation, and other uses. The towers also include indoor spaces that serve as flexible areas for meetings and celebrations.

Around the towers, the site is used for integrated system of ponds. A helophyte filter processes water, followed by aquaculture ponds with fish and crabs farms, and a final pond for storage. Adjacent agricultural land allows local food production—cassava, taro, sweet potatoes, or leafy greens—irrigated by stored water and enriched by composted organic waste. Livestock areas host pigs and chickens, while insect and bee farms contribute to pollination, food, and feed. A biogas system processes organic waste to provide backup energy and fertilizer.

Approximately 85% of all building materials are sourced locally, including timber, bamboo, thatch, clay, and stone. These are assembled using traditional Fijian techniques, such as coconut-fiber lashings and sago palm roofing. Imported materials—solar panels, filtration units, batteries, and metal connectors—make up the remaining 15% of construction. This approach helps reduce transportation costs and emissions, supports local knowledge, and allows for easier maintenance using familiar methods.

The site is not only for infrastructure—it supports agriculture, waste management, energy generation, and social life. The buildings and landscape are designed for multiple uses and open participation. Community members are involved in the building process and can take an active role in the site’s operation and evolution. The project tries to build stronger ties between people, place, and technology, and aims to provide a model for resilient island development based on local strengths and shared responsibility

**Technical Narrative**

The project “Marou – The Power of Community” integrates a set of low-impact and reliable technologies tailored to the island’s unique geographic, logistical, and climatic conditions. Its technical systems are designed to function cohesively, maximizing efficiency while minimizing resource input and environmental disturbance.

**Energy System**

 The primary energy source is solar photovoltaic (PV) generation, with an installed nameplate capacity of more than 75 kW. Most PV panels are integrated into the north-facing façades of three central Energy Towers, where their orientation maximizes sun exposure throughout the day. Additional panels are installed on the roofs of community buildings, ensuring full utilization of available surfaces.

The energy generated is distributed for immediate use in the village or stored in molten salt batteries, chosen for their resilience to high temperatures and long lifespan. In periods of low solar input, energy needs are supplemented by a biogas generator, fueled by locally produced biogas from organic, agricultural, and human waste.

**Water System**

 Water is harvested from three primary sources:

1. Rainwater, captured from the roofs and mesh façades of the Energy Towers.

2. Fog, condensed on mesh surfaces of the towers.

3. Surface runoff, collected via a gravitationally fed helophyte filtration pond system.

Water flows through a system of connected ponds including a helophyte filter, aquaculture and crab farming ponds, and a final storage pond.

After natural sedimentation and filtration, the water is directed to a centralized ozone-based filtration system, making it suitable for drinking, household use, or irrigation.

**Waste and Biogas Systems**

A decentralized waste management system processes human, agricultural, and organic waste. Public toilets and livestock shelters feed into a biogas digester, where methane is extracted and stored in adjacent biogas tanks. This biogas powers an auxiliary generator and supports energy resilience during overcast or cyclone conditions.

**Inputs and Outputs**

• Inputs:

Solar radiation, rainwater, fog, organic waste, human and animal waste, food production waste.

• Outputs:

Electricity ( more then 75 kW installed), filtered water, biogas energy, fertilizer (from biowaste), and food (via integrated agriculture, aquaculture, and livestock).

**Technology Selection and Adaptation**

Technologies were selected based on:

• Suitability for remote island conditions;

• Capacity for local maintenance and repair;

• Compatibility with traditional knowledge and materials;

• Resilience to cyclones and seismic activity.

Structural technologies favor modular timber construction with interchangeable parts to ease on-site assembly. The use of glue-laminated timber, natural lashing, and biodegradable local materials reflects a synergy between modern engineering and vernacular practice.

**Prototyping and Pilot Implementation Statement**

The prototyping and pilot implementation of the Marou project will focus on active collaboration with the local community to ensure the project aligns with their needs, values, and capabilities. We aim to build a strong partnership, integrating local knowledge and expertise into each phase of the design and construction process.

Initially, we will work closely with the community to identify key priorities. During the prototyping phase, hands-on workshops will provide training for local residents and us in traditional construction techniques alongside modern technologies. This ensures knowledge transfer and empowers the community to manage and maintain the system in the long term.

We would like to implement a participatory approach where community members actively contribute to building the infrastructure, fostering a sense of ownership and pride.

By utilizing local materials and methods, we aim to minimize the logistical burden and costs while ensuring that the systems are practical and sustainable for future expansion. Post-implementation, ongoing collaboration with local leaders will help refine the systems, ensuring they continue to meet evolving needs.

This process of community involvement is central to the success of the project and to the creation of a resilient, self-sustaining energy and water system.

**Operations and Maintenance Statement**

The long-term operation and maintenance of the Marou project will be a community-driven process, ensuring sustainability and resilience. The energy and water systems, including the solar towers, water filtration units, and biogas systems, will be managed primarily by the residents of Marou, with ongoing support from external experts when necessary.

Local residents will be trained in basic maintenance procedures during the construction phase, empowering them to handle routine inspections and repairs. This includes maintaining solar panels, monitoring water filtration systems, and operating the biogas generators. Additionally, community members will be involved in the monitoring of agricultural systems, including the aquaculture ponds and the use of organic waste for biogas production.

To ensure the continuous functioning of the project, we will establish a local operations team, supported by a small maintenance fund sourced from a portion of the energy and water savings. This team will be responsible for more technical maintenance tasks, while a wider network of villagers will assist with everyday operations and monitoring.

Workshops and community meetings could also be organized to ensure knowledge-sharing and to address any evolving needs or issues.This collaborative approach will not only ensure the longevity of the project but will also foster a sense of ownership and pride among the community, ensuring they have a direct role in the sustainability of their environment and resources.

**Environmental Impact Assessment**

The design of the Marou project prioritizes minimal environmental disruption while fostering long-term ecological regeneration. From material sourcing to energy and water systems, every component has been designed to work in harmony with the local environment.

Most construction materials—wood, thatch, stone, bamboo, and clay—are renewable, locally available, and biodegradable. This significantly reduces transportation emissions and avoids introducing foreign species or pollutants to the island ecosystem. Metal and technological components, which make up a small fraction of the materials, are selected for durability and longevity, minimizing replacement and waste.

The project’s water systems, including fog and rain harvesting, helophyte filtration, and gravitational flow ponds, support natural hydrological cycles without disrupting local waterways. These systems also help reduce flood risk and improve water access during dry seasons. Organic waste is fully utilized through composting and biogas generation, avoiding environmental contamination while enriching soils and supporting agricultural productivity.

Care is taken to ensure that energy infrastructure, such as solar panels and batteries, is safely integrated and shielded to prevent accidents or damage to nearby habitats. Wind-resistant architecture and elevated construction protect against cyclones and storm surges, minimizing the chance of debris or system failure harming the landscape.

By integrating food production, waste reuse, and energy generation into a closed-loop system, the project promotes biodiversity, soil health, and resource resilience. The goal is not only to minimize harm, but to restore and strengthen the relationships between community and environment—building a model of regenerative design that can be replicated across island communities.