**T R I** VIBE

**1. Concept Narrative**

Our project envisions a modular, triangular-shaped market space that combines renewable energy generation, rainwater harvesting, and community building, in one dynamic installation. Taking inspiration from the traditional village gatherings of Fiji, the design aims to create a producer market where both residents and visitors can engage in the exchange of goods, ideas, and culture.

The triangular geometry of our installation was chosen for both its structural and symbolic qualities. Triangles are inherently one of the strongest and most stable shapes, providing rigidity and structural integrity. This makes the installation highly resilient to environmental forces, while also allowing for a lightweight and modular construction system that can be easily assembled or expanded.

Beyond its technical advantages, the triangular shape carries a cultural resonance. The idea comes from traditional Fijian visual motives, such as the geometric patterns found in tapa cloths, the woven structures of palm leaf canopies, and the interconnected shapes of fishing nets.

The building incorporates sustainable materials such as recycled sawn timber and metal roofing. The open modularity in Fijian village life mirrors the adaptability of communal spaces, which change according to the evolving needs of the community. Rooftops with gentle slopes are equipped with solar panels that harness energy, while the same angles facilitate the effective collection and storage of rainwater in concealed tanks, promoting sustainable resource management.

Guests are welcomed into a space that encourages socializing, exchanging ideas, and commemorating special occasions, with naturally formed canopies providing shade and sunlight filtering through wood frameworks. The unique triangular shape of the market modules enables them to expand and adjust, resulting in intimate gathering areas and vibrant open spaces.

Co-benefits include improved local businesses, stronger connections between villages, and increased awareness of sustainable practices. Shared land use integrates various functions, such as market activities, social gatherings, energy generation, and water resource management, into a cohesive system — representing resilience through collaborative efforts within a community.

In the site plan, we propose a new pedestrian pathway connecting our installation to Marou village, linking smoothly with the existing road network. This path improves access for residents and acts as a symbolic connection between villages, encouraging exchange and community interaction. Market structures line the gently curving route, forming a lively central space. The paving extends beyond the path, flowing into nearby areas to create informal gathering spots. As it spreads out, the surface gradually fades and thins, blending into the landscape and guiding movement naturally.

The lamellas provide shading, bracing, and decorative qualities, with vibrant red, yellow, green, and blue surfaces that reflect the colorful vernacular of Fijian markets.

The installation seeks to enhance local tourism by presenting an authentic and lively market experience that highlights Fijian craftsmanship and agricultural products. Acknowledging that children frequently engage in play in this region, the design ensures the availability of open, secure areas for supervised play during market days. This guarantees that the project is truly

generational, enabling adults to participate in trade and social activities while children are actively and safely involved in the environment.

**2. Technical Narrative**

The installation utilizes solar photovoltaic (PV) panels that are positioned on north-facing roofs with a 12° incline, optimized to harness Fiji’s abundant solar energy. Given the islands’ location just south of the equator, this orientation and gentle tilt angle ensure efficient year-round solar exposure, as the sun shines at a steep angle from the north for most of the year.

The structure consists of 48×2 triangular wood elements, which together ensure the stable and secure mounting and provide the necessary structural load-bearing capacity for the entire system. The 24 vertical iron columns work in conjunction with the wooden structural elements to ensure the overall stability and load-bearing capacity of the support system.

The roofing and structural support system for the solar panels was designed using modular beam elements. For the complete installation requires support beams, in a total of 172 beams integrated into the structure. For the installation of the solar energy system, we used corrugated sheet roofing, which provided adequate structural stability and secure mounting. A total of 48 roof panel modules were installed as part of the system.

For the decorative elements of the building, we used a total of 24 decorative panels. Each decorative panel consists of the following elements: 24 pieces of 250 cm long, 4 pieces of 210 cm long, 4 pieces of 160 cm long, 4 pieces of 115 cm long, 4 pieces of 70 cm long, 4 pieces of 20 cm long diagonal rods. We used 4 different colours for painting.

**Energy production:**

The solar panels will produce more than 75 kW of clean energy annually, meeting the project's energy goals and potentially generating additional energy that can be shared with neighboring communities. A total of 48 solar panels were installed on the rooftop, each with a surface area of 9.60 m², resulting in a total photovoltaic surface of 460.8 m². The electricity generated will be delivered to the village via underground cabling, providing partial or full power supply from a sustainable energy source.

**Water harvesting:**

The project involves the controlled drainage of rainwater collected from rooftop surfaces, which is directed from designated low points of the roof into an underground cistern. Due to the favorable topography of the site the stored water can be distributed to the city through a gravity-fed pipeline network, contributing to the municipal freshwater supply. The system includes a sealed, high-capacity cistern and an ultraviolet (UV) filtration and disinfection unit,

ensuring that the harvested water meets health and safety standards for usage. We used 24 modules.

**System Inputs:**

• Sunlight

• Rainwater

• Community participation

**System Outputs:**

• electricity for lighting, cooling, and device charging

• retained water for agricultural, domestic, and hygienic purposes.

• a lively marketplace and gathering place for local communities and tourists

Technologies are selected based on their ability to withstand tropical climates and their minimal impact on the environment, guaranteeing a durable and sustainable installation. It is equally important to utilize locally sourced materials, in order to reduce the distance traveled for transportation.

**3. Prototyping and Pilot Implementation Statement**

Our team will begin the prototyping process by creating scaled-down models of the triangular modules, conducting tests to ensure their structural integrity and assessing their ability to collect solar and water energy. Local artisans and engineers will be involved from the beginning, ensuring that traditional Fijian building techniques and knowledge are incorporated into the process.

In order to conduct the full-scale structure, close collaboration with the leaders and residents of Marou village will be the top priority. Community workshops will provide training on basic assembly and maintenance techniques, enabling locals to actively participate in the construction and modification of the installation. The objective is to expedite and simplify the local construction process, which can be achieved by designing the structure in a modular manner.

By actively engaging in the installation process, the community will collectively contribute to its success, fostering a sense of ownership and responsibility for the project. In addition to our own initiatives, we plan to collaborate with local non-governmental organizations and educational institutions to guarantee the long-term sustainability of technical training and capacity-building programs.

**4. Operations and Maintenance Statement**

Maintenance will be designed to be user-friendly and community-oriented. The wooden components will be treated with natural, locally sourced preservatives to protect them from humidity and insects. The metal roofing and solar panels will need regular cleaning and inspection, which can be easily handled by trained local teams.

Rainwater tanks will have straightforward, user-friendly access points for cleaning and keeping track of water levels. Solar inverters and energy storage systems will be created with modular replacement capabilities in case any parts become worn out.

To protect the solar panels during the seasonal coconut fall—commonly referred to as the "coconut rain"—we propose the use of detachable protective mesh structures. These lightweight grids can be temporarily installed above the panels to shield them from impact damage without reducing sunlight exposure significantly. Once the risk period has passed, the mesh can be easily removed

The village will hold regular community maintenance days, motivating residents to actively participate in the upkeep of the village. A small fund raised through market transactions could cover minor repairs and system enhancements, guaranteeing the installation's continued functionality and durability over time.

**5. Environmental Impact Assessment**

Our design is based on a strong commitment to environmental sensitivity. The structure's lightweight design reduces the impact on the ground, safeguarding native vegetation and soil ecosystems. Opting for recyclable metals, and low-impact foundations such as ground screws helps minimize the carbon footprint associated with the building process.

Solar energy decreases reliance on fossil fuels, while rainwater harvesting alleviates pressure on freshwater supplies.

By implementing smart site planning strategies, such as using permeable ground coverings and strategically planting trees, potential negative impacts like stormwater runoff or habitat disruption can be minimized, thus preserving local biodiversity.

Furthermore, by providing an engaging cultural exchange environment, the installation encourages a stronger sense of responsibility towards the preservation of Fiji’s natural splendor among both residents and tourists, ensuring its long-term conservation.