**Solar Pavilion for the Community**

1. **Concept Narrative**

The proposed structure utilizes locally available materials, including coconut palm timber (5–7 m long, 10x10 cm beams, along with planks and boards of various sizes), strong ropes for solar panel adjustment, and textiles or woven coconut fiber mats for shading. These shading supplementals are crafted by the local community. The foundation is constructed with adjustable ground screws, minimizing soil disturbance, simplifying installation, and ensuring durability. The building is modular, designed in 6.4x6.4 m blocks, allowing for future expansion. The triangular bracing aligns with the solar panel tilt angle and can reflect the rich maritime heritage of the island. Primarily, the structure supports solar panels, which can be adjusted monthly using ropes and pulleys to maintain optimal sun exposure. This adaptability ensures maximum solar efficiency. Additionally, the space serves as a community hub for events, small markets and performances, benefiting both the local community and tourism.

1. **Technical Narrative**

Each solar panel measures 160 x 90 cm, using polycrystalline silicon photovoltaic technology. This type of panel offers a reliable balance between cost, efficiency, and durability, making it suitable for tropical climates like the one in Fiji. With approximately 400 m² of total panel surface, the solar installation produces enough energy to Marou village. Assuming an average solar irradiance of 4.5 kWh/m²/day in Fiji, and accounting for typical panel efficiency (15–17%) and system losses, each square meter produces roughly 1,500 kWh per year.

The system operates based on solar irradiance, panel orientation, monthly tilt angle adjustment (via pulley and rope system). The generated electricity will be used for powering key village infrastructure, so to transmit the electricity to Marou Village, a low-voltage underground distribution line will be installed using insulated copper cabling. This will ensure efficient and safe energy delivery with minimal transmission loss. To guarantee consistent power supply during cloudy days and nighttime, the system will include a battery energy storage unit, using lithium-ion or deep-cycle lead-acid technology.

1. **Prototyping and Pilot Implementation Statement**

The prototyping process will begin with community meetings and design discussions, where local knowledge, priorities and cultural traditions will be integrated into the structure’s final form. These dialogues are essential to ensure that the design is not only functional and durable, but also meaningful and rooted in local identity.

During the early stages, open feedback sessions will be organized to discuss expectations, answer questions, and adjust the design if necessary. Local voices will be given central importance in all decision-making processes, from spatial layout to shading preferences and community use.

Throughout the pilot build, community members will be actively involved in coordination, problem-solving, and future planning. This inclusive approach helps build local ownership and ensures that the final structure genuinely supports long-term needs — not only as an energy system, but as a gathering space that strengthens the social network.

1. **Operations and Maintenance Statement**

On the 15th of each month, solar panels should be tilted to the following angles:

* 15th December: 3.5°
* 15th February: 6.5°
* 15th March: 13°
* 15th April: 20°
* 15th May: 28°
* 15th June: 33.5°
* 15th August: 28°
* 15th September: 20°
* 15th October: 13°
* 15th November: 6.5°
* 15th December: 3.5°

The exact angles will be shown on the structure, to facilitate precise adjustment.

The structural framework will utilize simple mortise and tenon joints, facilitating easy repairs and adjustments. The shading solutions are locally produced, so they will not just protect against intense sunlight and enhance comfort, but decorate and express identity. Under the roof, simple logs will be placed, serving as benches or tables for community gatherings or for markets. Local residents will be trained in routine maintenance tasks, ensuring the system's longevity and fostering a sense of responsibility.

1. **Environmental Impact Assessment**

The installation aims to have a positive environmental impact by providing renewable energy, leading to lower greenhouse gas emissions. Using locally available coconut palm timber promotes sustainable forestry practices and reduces transportation emissions. We hope that thanks to careful planning, the installation does not disrupt local wildlife habitats or biodiversity.

Mitigation strategies could include monitoring the project's impact on local ecosystems, and the construction method could also training locals on sustainable practices and the importance of environmental conservation. By integrating these strategies, the project aims to enhance the resilience of Marou Village against climate change.