**LAGI 2025 FIJIW**

1. **Concept Narrative**

**Vision and Cultural Significance**

The Salusalu Marou Solar Park is more than a functional system – it is a spatial metaphor for salusalu, a cultural emblem of unity and care. Just as the garland is composed of may parts brought together in harmony, this park binds clean energy, landscape, and tradition into a meaningful whole. It serves as a model of cultural preservation through future-facing design.

**Program and Functions**

**Solar Energy Generation:** Photovoltaics arrays to be installed provide electricity for Marou Village and Yasawa School. The system is designed for off-grid autonomy with battery storage to ensure resilience.

**Water Access and Purification:** Rainwater harvesting and solar-powered filtration supply safe potable water to the community.

**Outdoor Classroom and Amphitheater:** An open-air structure inspired by Fijian architecture serves as a space for gatherings, storytelling, education, and ceremony.

**Walking Paths and Resting Zones:** Linear gardens are woven into the circulation system for social integration and proactive community gardening for edible and decorative crops. These routes encourage quiet reflection and connection with the landscape.

**Educational Elements:** Interpretive signage and small solar tech demonstration zone inform visitors about renewable energy and local culture.

**Site Planning and Layout**

**Central Weave:** At the heart of the park, the energy and water infrastructure are laid out like a salusalu strand - linear but organic – symbolizing flow and connection

**Zoning: Technical Zone:** Solar Panels and water tanks concealed with native plant buffers.

**Social Zone:** Seating and shaded spaces, multi-function event island for hosting community celebrations, art, farming and food exhibition, spaces for dances, rituals and educational workshops.

**Education Zone:** Outdoor classroom and amphitheater for exhibits, presentations, performances and interactive elements with Yasawa School.

**Landscape Integration**

**Native Plant Palette:** Uses drought-tolerant and cultural significant species – such as hibiscus, pandamus, and coconut palms – to support biodiversity.

**Seasonal Bloom Strategy:** Plantings are selected to reflect the rhythm of the seasons, reinforcing cycles of nature and renewal.

**Edible Gardens:** Community plots within the linear garden strands encourage food resilience and local stewardship.

**Materiality and Construction**

**Sustainable Materials:** Locally sourced timber, bamboo, stone, concrete masonry units and recycled elements for minimal environmental impact.

**Low-tech, High-Impact:** Construction methods allow for local participation and long-term maintenance.

**Community Engagement**

**Co-Design Process:** Village elders, youth, and school representatives contribute to design elements and programming.

**Cultural Programming:** Space for dances, rituals, and educational workshops.

**Capacity Building:** Training in solar maintenance and garden best practices ensures long-term stewardship.

**Scalability and Replication**

The design of the Photovoltaic-Rainwater Harvest Pod is modular and adaptable, making it possible to replicate the park’s core systems in other villages. A toolkit of strategies and components (energy, water, landscape, education) supports customization across diverse island contexts.

**Conclusion**

The Salusalu Marou Solar Park honors the past and powers the future. Like a salusalu, it encircles the community in beauty, function, and meaning – welcoming all who enter with the spirit of care, renewal, and resilience.

1. **Technical Narrative**

The systems input of sunlight and rain inspired a hybrid response involving a solar and rain harvesting system pod that is self-contained and modular for hosting both photovoltaic panels and rain collection storage. The photovoltaic system is linked to a neighborhood mini-grid and provides point of use location from its internal batteries and inverter. This flexibility allows structured daily use while maintaining access for convenience and emergencies. Additionally, it provides power for night lighting, wayfinding and solar pool lighting and water equipment for mitigating the mosquito vector cycle.

Each pod provides 3,200 watts of electricity. There are 25 pods distributed around the site thereby generating 80,000 watts . The system layout allows for future expansion by elongating the linear garden circulation system and attaching more pods. The liner gardens provide triple duty by offering shared land uses through social gardening along a path, offering a landscaped spine to connect with nature, and infrastructure for underground water and power lines. There is an open recreation space in the south zone of the site that has relatively flat terrain for expansion of the linear gardens the pod. The north garden strand extends into the existing village farmland linking residents with modern technologies.

The rainwater harvesting system consists of rain catchment surfaces of the photovoltaic array sloping toward a central basin, and off-the-shelf rain barrels for portability, flexibility, and maintenance. The internal capacity of the 2 tanks is 378 liters of water. They are capable of expansion by daisy-chain to additional tanks. An overflow device guides excess water to flow into the adjacent central wet pond through underground pipes. The wet pond is a water retention system to prevent flooding from stormwater and a natural filtration system for water sediments to settle at the pond’s floor before seeping into the aquifer. The water capacity storage of the pond is 900 cubic meters. The total systems output includes both electricity and clean water.

The hexagonal shape of the photovoltaic array offers relief from wind pressure by allowing air to flow around the structure more efficiently than flat sided walls. The central opening for collecting rainwater also tempers wind uplift by providing an opening to let wind flow through the opening and flow around the tilted angles of the photovoltaic array.

The pod prototype is constructed from local sourced materials of stock sized lumber and cement block units for the foundation. Plywood supporting the photovoltaic panels provide shear strength diaphragms for wind and seismic loads resistance.

1. **Prototyping and Pilot Implementation Statement**

The prototyping phase will proceed in the following stages:

Stage 1: Contextual Research and Co-Design

Collaborate with local leaders, elders, and craftspeople to understand spatial, cultural, and material preferences.

Analyze solar data, weather trends, and terrain using satellite and community-collected data

Review and analyze the prototype for technological viability and local identity.

Stage 2: Material Testing and Small-Scale Assembly

Test locally sourced or regionally available materials such as coconut timber structures, rust-resistant metal, UV-stable plastic materials)

Assemble test panels for durability testing – focusing on resistance to salt spray, heat and heavy rain

Incorporate learnings from local building techniques to improve resilience

Stage 3: Functional Mockup in the Village

Build a working prototype near a central community space such as a meeting hall or school

Monitor its energy output, resilience, and interaction with daily community life over a 6-month period

Adjust design based on feedback and performance

**Pilot Implementation Strategy**

After successful prototyping, a full-scale pilot will be implemented:

Site Selection: Install the pilot system at a key communal facility – such as a school, health clinic, or village meeting hall

Integration: Use locally trained technicians to install the system, and work with regional energy authorities to ensure grid compatibility if applicable

Energy storage and Backup: Include battery storage and potential backup for essential services such as lighting, refrigeration, and communications

Monitoring and Evaluation: Deploy remote and locally monitored tools to track performance, user satisfaction, and areas for improvement

**Community Collaboration and Capacity Building**

The long-term success of the initiative hinges on community ownership. This approach includes:

Participatory Planning: Begin with listening sessions, visioning workshops, and collaborative design meetings

Hands-On Training: Provide Workshops in solar installation, panel maintenance, and basic electrical safety for youth and trades people

Employment Pathways: Offer stipends or contracts for local labor during prototyping and installation phases

Cultural Integration: Respect local protocols, language, and decision-making hierarchies throughout every stage of the project

Education and Youth Engagement: Partner with schools to use the solar project as a living classroom for sustainability and science

**Anticipated Outcomes**

A resilient, culturally integrated solar energy prototype tailored to coastal village needs

Empowered local workforce with skills in solar installation and maintenance

Decreased reliance on diesel generators, reducing emissions and operational costs

A scalable model for renewable energy in similar island communities across the South Pacific

**Conclusion**

Initiative offers more than just clean energy – it proposes a path toward energy sovereignty, cultural preservation, and climate resilience. Through deep collaboration with the local community and responsive technological innovation, this project aims to illuminate a more self-reliant future for Marou and other villages.

1. **Operations and Maintenance Statement**

Ensuring the long-term performance and reliability of the photovoltaic system requires a clear, locally grounded plan for operations and maintenance. The system will be designed not only for energy efficiency, but also for ease of use of upkeep by local stewards, reducing reliance on external technicians of costly replacements.

Design for Durability and Simplicity

The PV panels, racking systems, and battery enclosures will be selected and constructed with corrosion resistance, modularity, and minimal mechanical complexity in mind.

Electrical systems will include visual indicators such as LED diagnostics to help non-specialists identify issues quickly.

All critical components will be protected from salt spray and cyclonic wind conditions through thoughtful placement, weatherproof housing, and elevated mounting.

Local Maintenance Training and Oversight

To embed resilience into the community itself:

A group of local energy stewards will be trained during the prototyping and piot phases to conduct regular inspections, clean panels, manage battery cycles, and perform basic diagnostics.

Maintenance protocols will be translated into local languages with clear visuals to support retention and inclusion across literacy levels.

A monthly maintenance checklist will be introduced, covering tasks such as:

 Removing debris or salt from panels

 Inspecting wiring for wear and corrosion

 Check battery levels and inverter function

 Recording and reporting any system alerts

Community Roles and Shared Governance

A community energy committee will be established to oversee the project-post-installation. This group may include village leaders, youth representatives, and trained technicians

The committee will coordinate:

 Rotating maintenance duties

 Monthly reporting of system status

 Use priorities during outages such as powering a clinic or refrigerated medicine

A small village-managed fund -sourced from savings on diesel, micro-donations, or external support – may be set up to cover replacement parts or external technical support if needed.

 Remote and Hybrid Support

 The system will be equipped with a remote monitoring system interface, allowing regional

 partners or engineers to assist with troubleshooting if advanced issues arise.

 Where appropriate, hybrid knowledge-sharing partnerships will be established with regional

Universities or solar NGO’s to conduct periodic system evaluations and offer technical refreshers to local stewards.

By centering the knowledge and responsibility for energy within the village, the project promotes not just technical sustainability, but also cultural continuity and intergenerational resilience,

1. **Environmental Impact Assessment**

The success of the project also depends on its environmental sensitivity, particularly in the context of a coastal ecosystem. While solar energy systems are a clean alternative to fossil fuels, thoughtful site selection and installation practices are necessary to prevent unintentional harm to fragile coastal habitats and community land-use patterns.

Potential Environmental Impacts

Key areas of concern include:

Soil Disruption and Coastal Erosion: Excavation for foundations or battery housing can destabilize soil in erosion-prone zones, particularly near the shoreline or on sloped terrain.

Vegetation Removal: Clearing native vegetation for installation could impact biodiversity, natural water filtration and windbreak functions.

Waste Generation: Improper handling of packaging, old batteries, or construction debris could introduce harmful materials into the environment.

Wildlife Disturbance: Glare from PV panels or construction noise may temporarily disturb bird species or local fauna.

Assessment and Site-Specific Study

To address these risks:

A pre-installation environmental survey will be conducted in partnership with local ecological experts or conservation groups.

The survey will identify:

Sensitive habitats such as Mangroves, and nesting areas

Traditional subsistence zones such as fishing paths, and agricultural plots

Natural drainage and erosion patterns

Based on findings, installation will avoid high-impact zones and adapt placement accordingly

Mitigation Strategies

Low-impact Installation Techniques: Use above-ground or minimally invasive mounting systems to avoid digging or damaging root structures.

Vegetation Buffer Zones: Retain or replant native vegetation around the site to prevent erosion and maintain habitat corridors.

Battery Safety and Waste Protocols: Ensure that all storage components are sealed and elevated; work with certified partners for safe battery disposal or recycling.

Visual and Acoustic Sensitivity: Opt for anti-glare coatings and restrict construction activities to non-sensitive periods such as outside bird nesting season.

Long-Term Environmental Stewardship

Integrate environmental monitoring in the community maintenance plan, including checks for erosion, runoff or vegetation regrowth.

Use the project as a platform for environmental education, inviting students and community members to participate in ongoing ecosystem care connected to the solar system site.

Through proactive planning and continuous stewardship, the project will not only minimize harm but can serve as a model for ecologically harmonious energy development in coastal island settings.