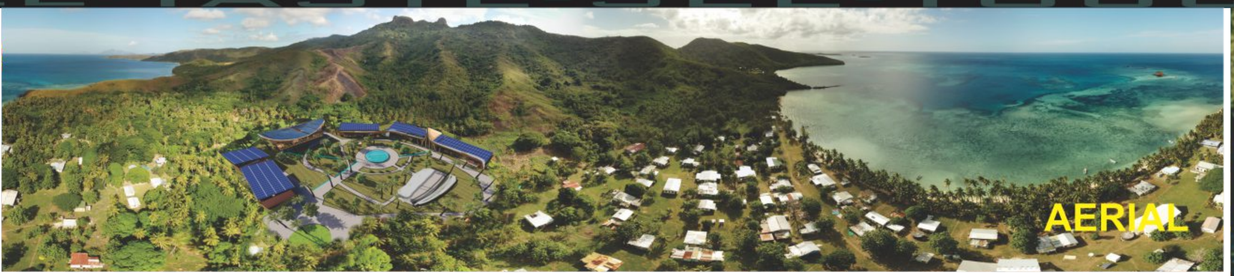


Description of the Sustainable Complex Buildings

A. Workshops (600 m²)
Design:
High ceilings (5-6 m) with solar skylights to maximize natural light.
Treated coconut wood and laminated bamboo structure on stilts for ventilation.
Features and Technology:
Workbenches with solar-powered USB outlets (powered by integrated flexible panels).
Recycled water system for pottery studios (filtered and reused).
Cross ventilation + solar-powered ceiling fans.

B. Cultural Building (300 m²)
Design:
Open floor plan with carved columns inspired by Fijian art.

Folding wood and glass walls to integrate indoor/outdoor spaces.
Features and Technology:
Coconut fiber acoustic panels and woven curtains for sound control.
Smart LED lighting (dimmable by

C. Bar (180 m²)
Design:
Recycled wood central bar with turquoise resin inlays (inspired by the ocean).
Terrace planted with Jasminum multiflorum (native to Fiji) for natural shade.
Features and Technology:
Solar Cooling: Efficient refrigerators + nighttime ice system (freezers that use battery power).
Bioclimatic fabric on roofs to reduce heat.

Filtered rainwater for drinks.

D. Local Market (600 m²)
Design:

Modular stalls with removable canvas roofs (UV-resistant).
Lightweight structure in bamboo and recycled steel.
Features and Technology:
Solar refrigerators with insulated thermopanels for fish and fruit.
Communal composter with biogas digester (uses waste for cooking).
Permeable floor for rapid drainage during rainfall.

Hybrid System: Solar Panels + Rainwater Harvesting on a Corrugated Metal Roof
Objective: Maximize energy and water efficiency in a tropical climate while maintaining a Balinese aesthetic.

1. **Roof Design**
A. Main Structure
Material: Galvanized steel sheet or stainless steel (resistant to saltwater corrosion).

Pitch: Minimum 20° for rapid water runoff.
Solar panels mounted on elevated rails, with 5-10 cm separation between the sheet and the panels.
B. Advantages of the Mixed System
Ventilated space: Prevents panels from overheating (increasing their efficiency).

Water flows below: Rainwater runs off the sheet without interfering with the panels.

2. Rainwater Harvesting
A. Key Components
Gutters:
Located at the edges of the roof.
Material: Recycled copper or UV-resistant PVC.
Prefilter:
Screen for leaves and coarse sediment.
Pipes:
Direct water to underground tanks (prevent algae and heat).

Filtration:
Sand and activated carbon filter for fine particles.
UV light (optional for water purification).
B. Storage
Underground tanks (fiberglass or polyethylene):
Capacity: 50,000+ liters (depending on rainfall in Fiji).
Located under gardens or traffic areas.
C. Water Uses:
Automated drip irrigation.
Sanitary and cleaning (after filtration).
Greywater system for gardens.
3. Photovoltaic Solar Energy
A. Flexible Solar Panels
Type: Amorphous silicon (thin-film) or bifacial panels.
Advantages:
Lightweight and adaptable to curves (optional for aesthetic areas).
Resistance to strong winds.
B. Energy Storage
LiFePO4 (lithium iron phosphate) batteries:
Capacity: 200 kWh per building.
Lifespan: +10 years.
Hybrid Inverters: Allow grid connection or island mode.

4. Fiji Architectural Integration
Wide roofs and pronounced eaves (like "Balinese eaves"), but with modern wood framing.
Raised stilts for natural ventilation and flood protection.
Wooden lattices for shade and privacy, without blocking panels.
5. Example Applied to Your Buildings
Water System Sector Solar Energy
Workshops Gutters + 20,000 L tank 50 panels + 100 kWh battery
Cultural Building UV filter for drinking water Curved roof panels
Bar Solar ice collection Photovoltaic refrigerators
Market Automatic irrigation with stored water Solar LED lighting
6. Key Benefits
✓ Self-sufficiency: Reduces dependence on external networks.
✓ Cost-efficient: Long-term savings in water and energy.
✓ Eco-friendly: Minimizes carbon footprint.

Formulas :
Number of Panels:Panels = (Daily Consumption) ÷ (Panel Power × Peak Sun Hours)

Example (Workshops): 250 kWh ÷ (0.45 kW × 5 h) = 112 panelsBattery Capacity:Estimated for 1-2 days of autonomy (depending on the criticality of the building).
Key AssumptionsSystem Efficiency: 85% (losses due to inverters, cables, etc.).

Adjusted Consumption: Typical values for tropical climates (ventilation > heating).

Available Roofs: Only 60% of the roofed area is used for panels (the remaining 40% is for water harvesting and structure).Additional

RecommendationsPanel Orientation: Toward geographic north (in Fiji) with a 15-20° tilt.

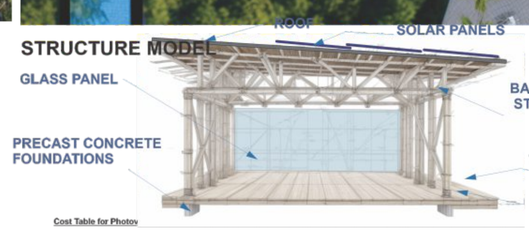
Building Daily Consumption (kWh) Panels (450W each) Batteries (LiFePO4)

Workshops (900m²) 250 kWh/day 112 panels 200 kWh Includes power tools, lighting, and ventilation.

Cultural (300m²) 120 kWh/day 54 panels 100 kWh Stage lighting, audiovisual systems, and air conditioning.

Bar (180m²) 80 kWh/day 36 panels 50 kWh Refrigerators, blenders, lighting, and ventilation.

Market (600m²) 150 kWh/day 67 panels 150 kWh Lighting, basic refrigeration, and payment systems.



Cost Table for Photov

USD costs for implementation in Fiji)

System	Equipment (Brand/Model)	Capacity	Units	Unit Cost	Total Cost	Performance
PHOTOVOLTAIC SYSTEMS						
Workshops (600m²)	Canadian Solar HiKu7 550W		55 kW 100	$220	$22,000	164,250 kWh/year
Cultural Building (300m²)	SunPower Maxeon 3 400W		32 kW 80	$280	$22,400	82,125 kWh/year
Bar (180m²)	LG Neon R 375W	15 kW 40		$190	$7,600	49,275 kWh/year
Market (600m²)	Trina Solar Vertex S+ 450W		54 kW	$210	$25,200	164,250 kWh/year
V Subtotal		156 kW			$77,200	460,900 kWh/year total

Cost Comparison by Building Type

Building	Area (m²)	PV System (Total)	Water System (Total)	Total Cost/m²
Workshops	600	$213,000	$84,000	$495/m²
Bar	180	$44,100	$21,600	$365/m²
Market	600	$213,000	$84,000	$495/m²