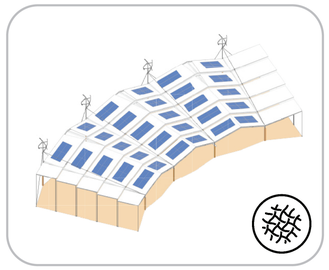
THREADSCAPE

WEAVING MAROU VILLAGE'S ENERGY, WATER, AND COMMUNITY THREADS INTO AN ECOLOGICAL ARTWORK

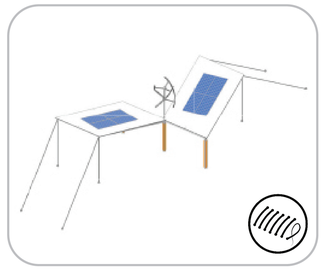
Threadscape is a land art installation that weaves energy production, water purification, and cultural gathering into a living system. Each structure plays a role in delivering renewable energy, managing water, and shaping a resilient public realm for the Marou Island community. Designed to be adaptable and replicable, the village's future is not fixed—but continually woven.

A LIVING TOOLBOX FOR MAROU RESIDENTS



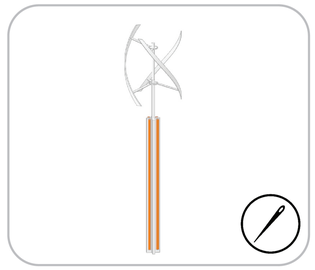
Canvas: Major Solar and Storage

120 pieces of 700W high-efficiency monocrystalline PV panels; 4 local-fabricated vertical-axis wind turbines (VAWT) as alternatives; 1 MWh battery storage supplimented with hot water and ice storage



Patch: Modular Energy

Single or double roof panels with 4 PV panels with smaller VAWTs, more locally scalable solution



Stitch: Wind-Powered Street Lamp

Lighting strips powered by VWAT

ENERGY

SOCIAL

Shelter

Provide shading for sun and coverage for rain

Activities

Educational hub; community gathering space; tourist welcome center

Outdoor Entertainment

Playground; garden; park

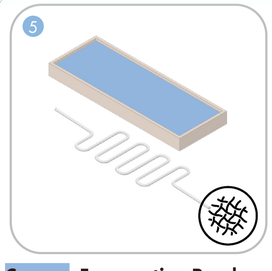
Utilities

Street lights; drinking water purification

Agriculture

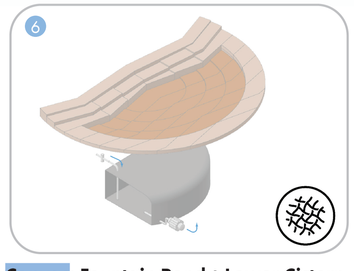
Irrigation; storage

WATER



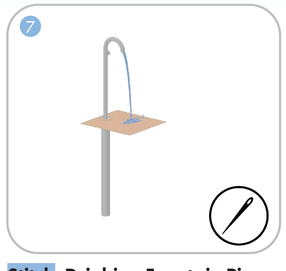
Canvas: Evaporation Pond

Distillation process using solar energy and electricity



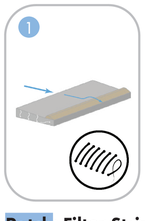
Canvas: Fountain Pond + Lower Cistern

Drinking water is stored in a lower cistern and pumped up using solar power. The pond's water level indicates abundance



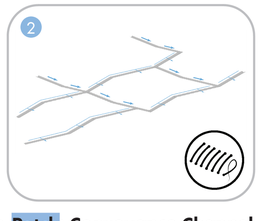
Stitch: Drinking Fountain Pipe

For community member to collect drinking water during dry seasons



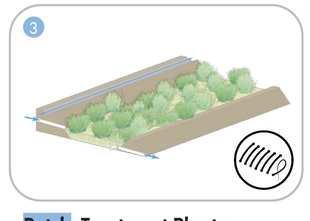
Patch: Filter Strip

Vegetated buffer used to remove sediments from urface water runoff



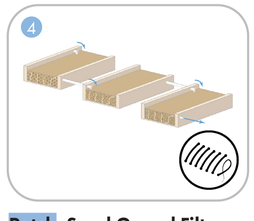
Patch: Conveyance Channel

Pebbled channel that carries excess water to treatment planters



Patch: Treatment Planter

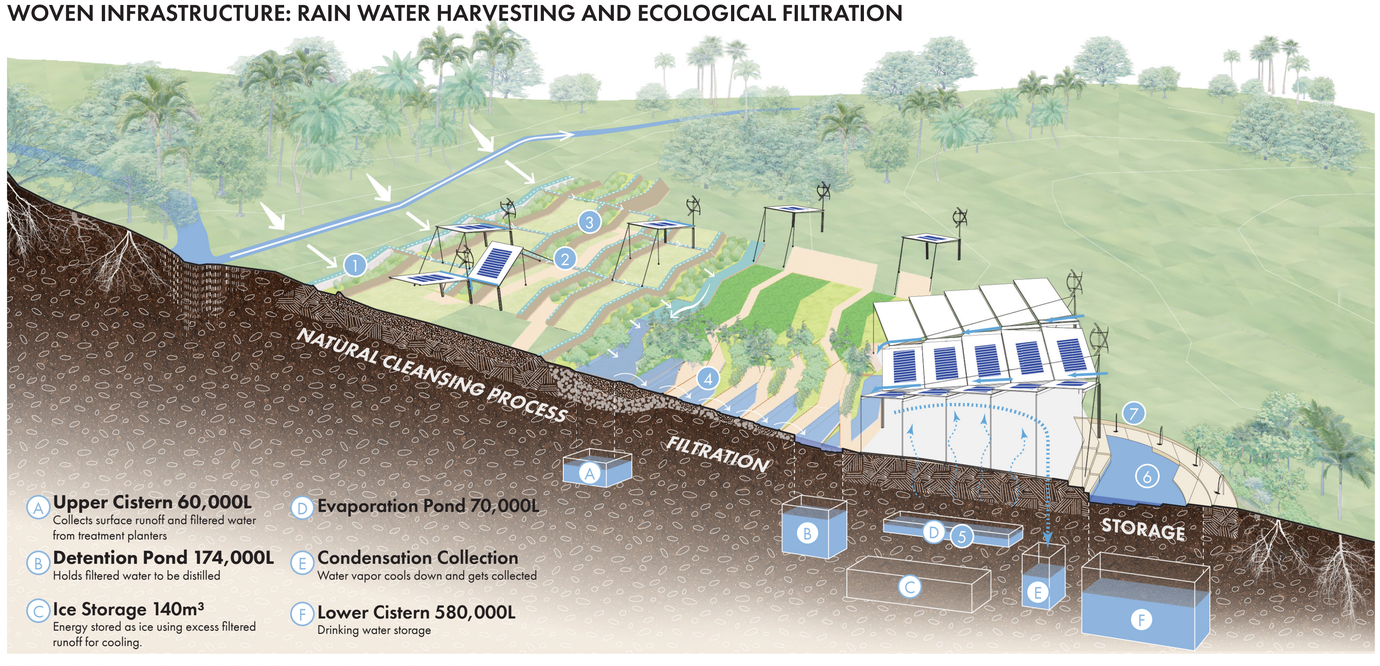
Runoff infiltrates and is naturally cleansed through soil and vegetation



Patch: Sand Gravel Filters

Lighting strips powered by VWAT

WOVEN INFRASTRUCTURE: RAIN WATER HARVESTING AND ECOLOGICAL FILTRATION



A Upper Cistern 60,000L
Collects surface runoff and filtered water from treatment planters

B Detention Pond 174,000L
Holds filtered water to be distilled

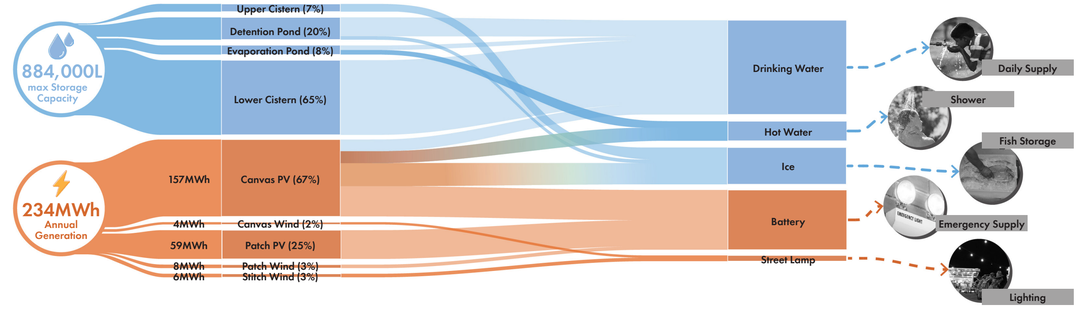
C Ice Storage 140m³
Energy stored as ice using excess filtered runoff for cooling.

D Evaporation Pond 70,000L

E Condensation Collection
Water vapor cools down and gets collected

F Lower Cistern 580,000L
Drinking water storage

ENVIRONMENTAL IMPACT & CALCULATIONS



Calculation & Simulation Assumptions

- PV panel generation is simulated in ClimateStudio using the TMYx weather file of Yasawa-i-Rara
- The energy generation of the vertical-axis wind turbines (VAWT) is calculated with the formula $P = 0.5 * \rho * A * Cp * V^3$, under the following assumptions:
  - The average wind speed (V) is assumed to be 6 m/s
  - The air density (ρ) is assumed to be 1.2 kg/m³ for humid tropical sea-level
  - The power generation coefficient (Cp) is assumed to be 25% for a hand-crafted wind turbine
- 1 MWh battery system selected to power the village for 12 hours under peak load or > 2 days under regular consumption