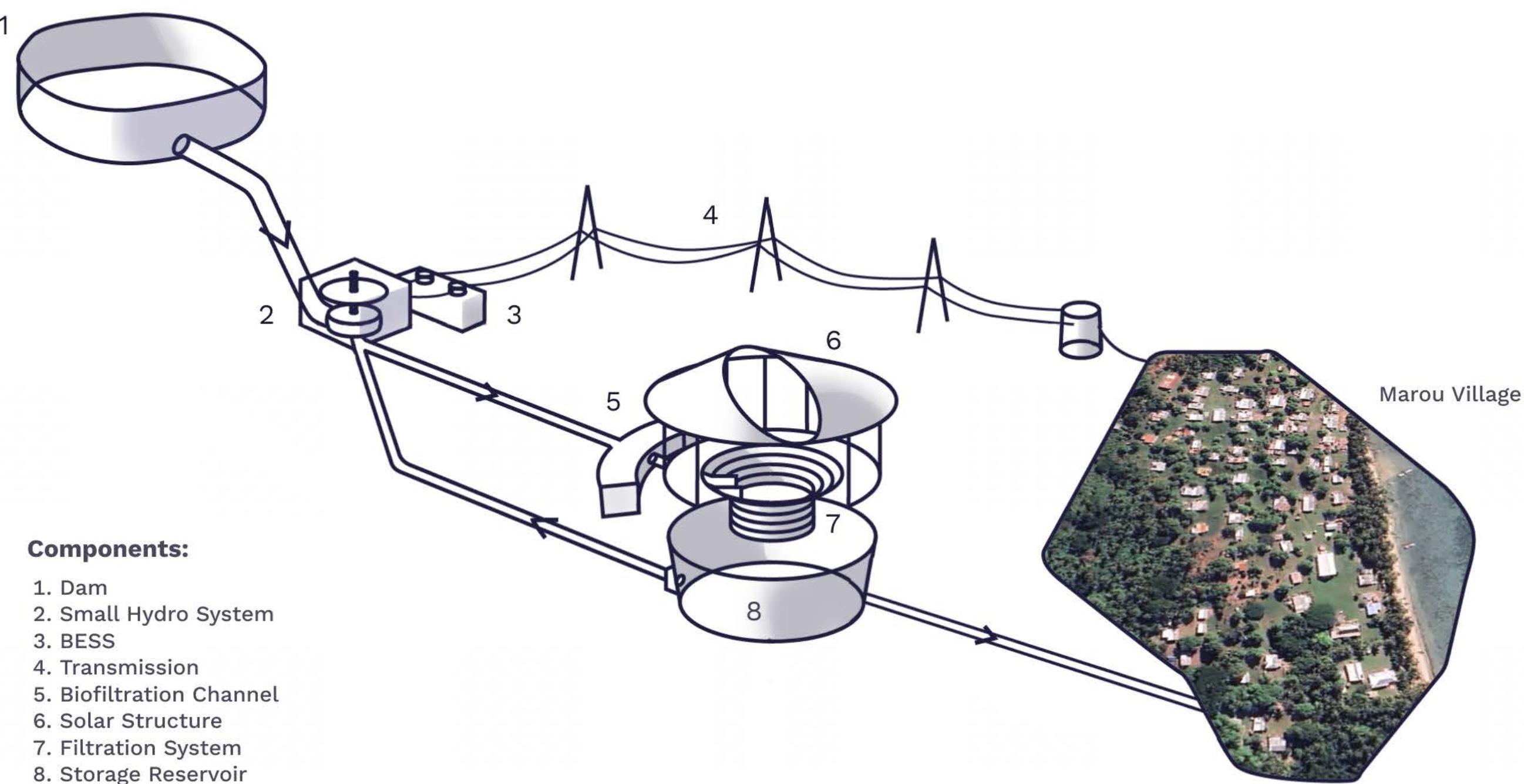


Energy-Water System Diagram



Small Hydro System
A micro-hydropower system is installed first by revitalising the village's old dam infrastructure. Stormwater from the mountainous catchment is stored in the dam and channelled through a low-head micro-hydro turbine system (~15 kW capacity) to the Channel Reservoir. This provides continuous base-load power, particularly during the rainy season when solar output is reduced, reducing battery reliance.

Solar Photovoltaic (PV) System
The solar PV installation consists of two complementary components:
The Solar Pavillion: 50 kW of ground mounted solar array in a parametric arrangement creates the shade structure of a new community building.
Rooftop Solar Systems: Approximately 30 kW of distributed solar panels are installed on key community buildings, including the recreation centre and selected residential homes.
Combined, the system exceeds the required 75 kW minimum PV capacity, ensuring ample daytime energy production while offering modular expansion possibilities.

Battery Energy Storage System (BESS)
A centralised lithium iron phosphate (LiFePO4) battery bank (~300 kWh usable capacity) provides electricity overnight and in the early morning. The sizing ensures: Nighttime energy availability (peak evening loads around 11–16 kW). Backup capacity for at least 1.5 days of autonomy during extended cloudy periods.

Rainwater Harvesting and Storage
All solar panel surfaces are optimised to collect rainwater into first-flush filtered storage tanks, feeding into the Storage Rservoir.
Solar Structure Rainwater Harvesting Area: ~400 m² of solar panel surface yields approximately 600 liters per 10mm rainfall event.
Storage Reservoir: An underground HDPE water tank of ~200,000 litres exists under the Solar Structure, supplementing existing village tanks and Reservoir 2 capacity.

Water Treatment
Simple nature-based filtration systems (e.g., gravel-sand filters) and biofilters are feature towards and in the pavillion.
First, the discharge from the dam offloads stormwater into the Channel Reservoir, where it is filtered by native species of Vetiver Grass, Canna Lily, and Water Hyacinth. This water, joined by the water collected by the Pavillion roof, are collected into the center of the staircase structure, paved by a permeable concrete, into a Filtration System, which then purifies drinking water into the Storage Reservoir for the village to use.

Stormwater Management and Household Water Supply
The Dam, Biofiltration Channel, and Storage Reservoir act as critical stormwater detention basins, reducing flood risk during heavy rains. Gravity-fed pipelines and solar-powered pumps convey water from Reservoir 2 for agricultural use, household needs, and fire safety.

