**Concept Narrative**

The conceptual starting point of this design is the coconut sapling. The leaves of the coconut sapling grow upward to collect solar energy, and the coconut rhizomes buried in the soil become water containers. Plants are very efficient in using sunlight and water, and the device we designed imitates this characteristic.

The device has a top that can move with the wind. The photovoltaic panels are installed on the top to collect solar energy. Because it is very light, it can rotate with the wind. As it rotates, the top drives the connecting rod of the air pump to pump air into the underground water collector. Because the air in Fiji is hot and humid, when the air enters the cooler underground container, the water vapor can condense into liquid water and then be stored in the container.

The top is supported by a lightweight fiberglass keel, the upper part is supported by an aluminum alloy sheet to support the cadmium telluride photovoltaic panel, and the lower part is made of ETFE lightweight film, so that the entire top is light enough to move with the wind.

The lower support structure and underground water storage device are made of 316 stainless steel. Steel is a good thermal conductor, which is convenient for transferring heat in the air. At the same time, 316 stainless steel is also a food-grade material, and the stored water is cleaner and safer.

When many devices are installed together, their tops can rotate together with the wind, and the shape of the entire row of devices is the shape of the wind. In this way, the device forms a unique landscape that changes all the time, becoming a necessary choice for tourists to visit.

1. **Technical Narrative**

This design uses CdTe photovoltaic panels to obtain solar energy in solar power generation. CdTe photovoltaic panels have the ability to generate electricity stably in low-light environments and high-temperature environments, and have strong adaptability to the climate of the site; in terms of water collection, the simpler ground source heat pump technology is used. It only needs to continuously send air into the ground to continuously obtain water from the air.

A single device can generate 120,000 kWh of electricity per year and is expected to collect 150 cubic meters of water (estimated). We have designed a total of 40 such devices for local residents to use.

The input of the device for power generation is sunlight, which is output as electricity by photovoltaic panels.

The input of the device for water collection is wind energy and humid hot air. Through the inside of the device, the heat in the air is transferred to the ground and clean water is output.

1. **Prototyping and Pilot Implementation Statement**

The principle of this design prototype is relatively simple. The possible difficulties are 1. The weight balance of the top wind plate; 2. Whether the shaft can allow the top to rotate flexibly; 3. The efficiency of the air pump connecting rod; 4. The buried depth of the water storage container. In order to conduct experiments, a single unit can be made for trial first, and then mass production and on-site installation can be carried out after multiple rounds of improvements.

The designer team is currently in China. Hainan Island in China has similar climatic conditions to those in Fiji. We hope to cooperate with Chinese photovoltaic manufacturers in the device experiment stage, and first carry out preliminary product molding in Hainan Island. When the test is completed and the basic principle is verified, further communication and exchanges will be carried out with the local community.

This design is composed of an independent device array, so it is relatively convenient to improve the device according to the needs of the local community. In the subsequent community cooperation, we can improve the product according to the local community's needs for power generation and water collection, increase the efficiency of a single device or adjust the number of devices in the array.

1. **Operations and Maintenance Statement**

The maintenance required for this device includes the following points: 1. Cleaning of photovoltaic panels; 2. Cleaning of water collection containers; 3. Fixing of the top plate in typhoon weather. 4. Monitoring and maintenance of battery devices.

In operation and maintenance, local communities can use a mop with a long pole to clean photovoltaic panels; for water collection containers, the device is designed with bolts that can be disassembled at the top and bottom, so that the upper device can be disassembled and reassembled after cleaning; for fixing the top plate in typhoon weather, the device can remove the top plate along the rotating shaft and place it on the ground and fix it with ropes, and then assemble the top plate after the typhoon weather; for monitoring and maintenance of battery devices, battery manufacturers can be invited to conduct community training, use professional equipment for regular inspections, and connect data to the Internet.

1. **Environmental Impact Assessment**

This design may have one impact on nature. The water collector buried underground continuously sends the heat energy in the air into the ground, changing the original temperature of the underground soil. Regarding this issue, we can use a larger volume of concrete foundation, let the concrete foundation become a heat regulator, and allow the heat to be transferred to the natural soil more slowly.