1. **Concept Narrative**

‘’Palm heart’’ - is our eco-friendly project developed specifically for the village of Marou. Inspired by the aesthetics and culture of local settlements, influenced by the local atmosphere and traditions, we created our installation. Intensive work on the project spanned several months—all to ultimately present a worthy outcome as a potential final installation variant for the Fiji islands.

The overall complex installation consists of simple modules that assemble into one unified structure.

The concept for the shape of our object is inspired by the image of a Fijian coconut palm. The silhouette of one module represents a sort of "flower" on a vertical stem, thereby evoking the outline of a coconut palm.

The entire installation occupies an area of 273 m², which amounts to 1.8% of the allocated construction site. It is worth mentioning that the building structure allows its area to be easily expanded to any desired size and scale, as well as replicated on other islands and plots.

1. **Technical Narrative**

Main function of our installation is the conversion of solar energy into electricity. Based on its function, we have placed solar panels on the entire outer surface of the petals of our module—thus selecting an appropriate and advantageous location for the technology. Additionally, a single module not only captures sunlight and energy but also collects rainwater for its purification and further use by the residents of the village of Marou. In the center of the module, there is an opening for water collection. The petals, forming a small funnel, facilitate the accumulation of water in the desired place. After collection, the rainwater undergoes several stages of filtration and purification before being delivered directly to the village residents for consumption and agriculture.

We have utilized a multi-stage rainwater purification system:

Preliminary purification

- Use of nets to remove leaves, debris, and large particles immediately upon rainwater collection.

Mechanical filtration

- Application of filters with varying degrees of porosity.

UV disinfection

- Use of ultraviolet lamps to eliminate microbial organisms.

Additional purification

- Application of reverse osmosis to obtain potable water of the highest quality.

We have chosen these particular technologies to best meet the population’s needs for inexpensive electricity. The energy generated by the solar panels is sufficient for the comfortable existence of the entire village, supporting daily life and agriculture.

Our object also boasts additional pleasant features, such as a tourist zone and a recreational area. Anyone can spend time within our installation, relax, and organize their leisure activities. For this purpose, modular benches are arranged within the shaded areas under canopies, along with a well-equipped pavilion for meetings, gatherings, masterclasses, and other events.

Average power of the solar panel is 250–300 W/m². Specific power: 0.275 kW/m² (275 W/m²).

To generate 75 kW, 273 m² of solar panels are required.

A 15,000 m² site allows this system to be easily accommodated, taking into account additional infrastructure.

1. **Prototyping and Pilot Implementation Statement**

In the process of developing our project, we took into account all the nuances of the proposed construction site location. Since the site for assembling the installation is situated on a remote island, which is quite difficult to access, we ensured that our structure is simple to execute and equally functional. The petals of the module easily and securely connect with each other, and the stem is robust enough to withstand the climatic conditions. The assembly and installation process of the installation will proceed quickly and simply, without causing any discomfort to the local residents. Any interested local residents who have taken an interest in the construction and installation of our project are welcome to join the implementation process.

1. **Operations and Maintenance Statement**

Also we offer local residents the opportunity to develop the tourism function on the island

Within the installation we will organize zones for hosting master classes aimed at introducing and teaching local craftsmanship

At the request of the local residents we have also created areas for cultivating various crops and plants, as well as hydroponic zones

The local community will make a significant contribution to the maintenance and development of our project. The primary care for the facility can be provided by the local residents, while the responsibility for technical maintenance should be assumed by specially trained personnel.

1. **Environmental Impact Assessment**

Our project represents an environmentally clean system for generating clean energy

We have taken every measure to preserve the existing vegetation on the development site and have positioned our installation in such a way that it does not replace the abundance and richness of the local nature, but rather complements it. We did not plan to remove the trees and other elements of flora and fauna present on the site. Taking their locations within the development area into account, we have compositionally arranged the modules of our structure in an efficient manner

Solar panels are a source of renewable energy; however, their placement can have both beneficial impacts and environmental challenges. Let us review the main aspects of their impact on the local ecosystems of Fiji

\*Positive effects

- Reduction of carbon emissions by replacing fossil fuels

- Possibility of integration into agrivoltaics, where solar installations are placed alongside agricultural crops, thereby preserving or even enhancing the condition of soils and water resources

\*Negative effects

- Destruction or fragmentation of natural habitats. Without careful planning, solar power stations may affect critical ecosystems and lead to a decrease in biodiversity

- Disruption of migratory routes for birds and insects. Large-scale installations can create barriers in the landscape and influence animal behavior

- Potential changes in the microclimate within the installation area due to alterations in surface reflectivity and airflow

Key recommendations for minimizing negative impacts

- Conduct an environmental assessment that considers the specific features of the local flora and fauna

- Utilize technologies that allow the solar panels to be harmoniously integrated into the landscape

Thus, careful planning and consideration of the island’s ecological characteristics will help reduce the negative effects of solar panels and promote sustainable energy development in Fiji.