**Concept Narrative**

Solar Flux, the mobile art installation, seeks to engage community members and tourists alike with a playful and interactive opportunity to connect deeply with both the surrounding landscape and the newly integrated technological systems. Designed as a dynamic, sustainable experience, Solar Flux weaves together art, utility, and environmental stewardship in a way that feels organic and imaginative.

At the heart of the installation is a system of solar panels that are optimized to track the sun throughout the day. These panels constantly adjust to maintain the ideal solar angle, generating the maximum amount of electricity possible. Their smart tracking ability is further enhanced by a community-driven feature: the heights and positions of the panels can be adjusted by community members themselves, inviting local engagement and personalization. Mounted on a track and rail system, these solar units can be easily repositioned, and more importantly, can be lowered and safely stored within protective pavilion structures when storms or severe weather threaten the site. This protective feature helps prolong the lifespan of the panels and allows for more sustainable maintenance of the system.

The hybrid steel and bamboo pavilions also play a dual role—not only do they serve as protective housing for the panels, but their gently sloped roofs also support rainwater catchment. Rainwater is directed into underground cisterns, where it is stored for future use, particularly in agricultural irrigation and other vital community needs. This simple yet effective system allows the installation to actively support local farming efforts by supplementing water availability and promoting resilience in the face of shifting weather patterns.

An exciting and engaging component of Solar Flux is its bike-powered rail interaction. Two of the four solar panel railways are dedicated to human-powered experiences—visitors can ride specially designed bikes attached to the tracks, propelling the solar panels across the site. These can be used for a casual journey across the beautiful landscape or for friendly competition in a two-track solar panel bike race. This component not only adds a fun element to the design but also encourages physical activity and a hands-on understanding of renewable energy systems.

In tandem with the solar system, a series of HydroPanels lines the curved rail pathway. These devices capture atmospheric moisture and convert it into clean, drinkable water. Like the rainwater system, this purified water is stored in underground cisterns to provide a consistent and sustainable water source for the local population. The water is accessible by the community through handpumps, insuring they always have access to clean drinking water.

The track itself curves throughout the site, thoughtfully connecting existing farming plots with expanded growing zones. The pavilions are designed to work as a rest area for farmers, and tool storage to support their farming. Designed in two major phases, Solar Flux allows for future expansion, enabling growth from either end of the installation as community needs evolve.

In essence, Solar Flux redefines the relationship between community, environment, and technology, inviting all who encounter it to imagine a future shaped by innovation, interaction, and sustainability.

**Technical Narrative**

Our land art design for the Marou Village integrates a series of advanced energy systems aimed at ensuring the long-term sustainability of the community by providing reliable energy and water for drinking and irrigation. The primary system driving this initiative is a photovoltaic solar array, strategically placed on individual operable poles and the roofs of the pavilion structures. Each solar panel spans 6 1/4 square meters and, on an annual basis, is expected to produce up to 1.04 kW of power. Collectively, our current design incorporates 106 photovoltaic (PV) panels, which will generate 110.4 kW of energy each year for the village. As Fiji's energy demands continue to grow, this solar installation represents the first step in a broader initiative to transition toward a fully renewable island economy, one that relies solely on clean energy sources. Harnessing the abundant solar radiation in the area, the system will convert the captured solar energy into direct current (DC), which will then be converted into alternating current (AC). This energy will be stored in batteries and distributed as needed to power electricity, appliances, and various other community needs throughout the year.

In addition to energy production, we recognize the critical importance of ensuring consistent access to clean drinking water for the community. To address this, we have integrated a series of HydroPanels into the design. These innovative panels efficiently capture water vapor from the air and, utilizing small integrated solar panels, convert the vapor into liquid water. This water is then purified and stored for drinking purposes. In addition to providing drinking water, excess water produced by the panels will be stored in underground cisterns and made available through a simple hand pump for community use. The current design includes 30 HydroPanels, with provisions for future expansion as the community's water needs grow. Each panel is capable of producing approximately 126 liters of water per month, resulting in a total annual output of just over 45,000 liters of clean, potable water.

The design of the pavilions also addresses water needs in a broader context. Six separate pavilion structures are strategically placed across the site, each designed to collect rainwater runoff. This water will be stored in underground cisterns and can be accessed via hand pumps for various purposes, including irrigation and other communal needs. The input for this system is rainwater, while the output is untreated water suitable for non-potable applications. This simple, low-tech system will significantly support the ongoing maintenance and future development of farming land, ensuring a reliable water source for agricultural activities that produce food for the community. By promoting sustainable farming practices, this system will not only facilitate the ease of farming within the village but also position the community for future growth and adaptability as emerging needs arise.

In conclusion, these integrated energy and water systems provide Marou Village with the foundation for a resilient, sustainable, and self-sufficient future. By combining clean energy production, water harvesting, and efficient irrigation systems, the design sets the stage for a thriving community that is well-equipped to meet its evolving needs.

**Prototyping and Pilot Implementation Statement**

The design of Solar Flux is proposed in a three-phase development. Stage one will focus on creating a stable base infrastructure. It will be comprised of 30 HydroPanels, Three shelters, four rails, twenty automated solar poles, and three interactive solar bikes. Stage two will be a mirror of the first stage. The only thing that would not be mirrored would be the HydroPanels, as the current number is expected to produce an adequate amount of drinking water for the village. These two sets would be connected through the interactive bike rails. Stage three and all following stages would continue the trend of mirroring the shelters and rail design. Due to the modular nature of the design, it could also be proposed anywhere where energy and water is needed. The only constraints are time, space, and funding. This phasing process allows the villagers to expand the design as their energy and water needs increase.

Before the design can be implemented, it needs to undergo a prototyping phase. The first step would be to determine the exact construction details of the poles, structure, and rails. This will look like a series of prototypes, each focusing on a different moving component of the design and how they will work together. A critical test will be to determine if the way we proposed the energy from the solar panels moving along the trails will function as predicted. In terms of technology, we will also need to test and prototype the program that would optimize solar angles. Additionally, we will be experimenting with how best to get the needed supplies to the Village of Marou, keeping in mind the transportation logistics. While sorting out the transportation logistics, we will also be in communication with the residents of Marou. The goal of this will be to get feedback on the design from the people who will be using it. Based on that feedback we will modify the design as we prototype to better serve the community. Once we have a functioning protype we will be able to move onto the implementation stage.

When it comes to the full-scale implementation process, the first step will be to manufacture the technical components that can’t be created in the village. Currently we are proposing that this will be comprised of the solar panels, the HydroPanels, the pole systems, the custom bikes that attach to the interactive poles, and the metal fish scale facade. Once they have been manufactured, they will be shipped to the island. The first step will be to set up the HydroPanels and the system allowing access to drinkable water. This includes excavation to place underground cisterns for excess water storage. Next would be to construct the shelters, allowing a space for workers to shelter during breaks and farming equipment to be stored. These would utilize local bamboo combined with steel where the bamboo will not meet structural needs. The structure is then enclosed with premanufactured solar panels and the metal fish scale facade. Once these were constructed work on the rails would begin. This would start with the excavation for pouring concrete, utilizing local sand, and the installation of the rails. When the rails are completed, the poles can be assembled and connected to the track, creating energy stored in large batteries for the local village to utilize. This will be the completion of phase one. As more water and energy needs arise in the community other stages and other locations can be implemented.

**Operations and Maintenance Statement**

While the project is designed to promote playful interaction with the technological systems, it is also designed to operate independently with no action needed for regular daily operation, relying on minimal maintenance requirements per the manufacturers. The angle of the solar panels automatically adjusts to keep them at the most effective angle to the sun. This allows for efficient energy generation from the panels. The HydroPanels specified for the project are designed to be low maintenance. Some periodic maintenance of the project will be necessary and there are also actions that the community can take during severe weather to help protect and ensure its longevity. Members of the local community will contribute to the maintenance and operations of the installation in several ways.

For the solar panel units, maintenance includes clearing the tracks of dirt and debris as needed that could prevent the solar panels from being moved along them. The solar panels themselves may become dirty from bird droppings and debris falling on them, reducing the amount of light they can take in. Cleaning the solar panels will restore their efficiency. In the event of a severe storm, the individual solar panel units can be folded down and pushed into the shelters by members of the community. This is to prevent damage to the solar panels and ensure their lifespan is as long as possible. Before storing the panels, the automatic solar panel angle adjustment system will need to be switched off. Once the storm has passed, the solar panels can be moved back outside and the optimization system reactivated.

Maintenance for the HydroPanels includes replacing the air filters, carbon block, and mineralization cartridges once per year. Regular replacement of these components extends the lifespan of the HydroPanels, continuing to provide clean drinking water to the community.

**Environmental Impact Assessment**

The installation will impact the ecosystem through soil disturbance and loss of vegetation during the construction process. In addition to short-term effects of construction, there will be some permanent loss of vegetation due to the space taken up by the tracks and the reduced sunlight available in areas shaded by the solar panels. This problem has been mitigated by designing the project to use only a small strip of concrete to install the rails for the tracks, ensuring minimal site disturbance. This leaves as much open space as possible in between the rails where plants can still grow. Additionally, the proposed expansion of the farming areas will further reduce the area available for native vegetation. This can be mitigated through sustainable farming practices that increase crop yield, producing more food in a smaller space. There will also be a slight reduction in available water for native plants on the site because the water falling on the roofs of the shelters will be collected and stored for crop irrigation. However, this is a small amount of water that is being collected and is anticipated to have a negligible impact on the ecosystem.

Increased human activity in the area is expected as a result of construction, members of the community interacting with the project, and possible visitors coming from outside of the community to see the installation. This has the potential to impact the ecosystem by disturbing birds and other animals that are sensitive to the presence of humans. They may leave the area as a result, possibly causing reductions in the numbers of certain species and changes in their distribution. Informal path systems can be implemented to suggest ideal site circulation and reduce food traffic in other areas of the site to allow for proper protection of existing vegetation and wildlife.