**LAGI 2025 Fiji**

1. **Concept Narrative**

Our project is driven by a desire to merge beauty and functionality in architectural design while addressing urgent environmental concerns. We were inspired by the potential of architecture not only to serve human needs but also to generate clean energy and reduce carbon emissions. As we developed our design, we realized that the very form of the pavilion could contribute to its function: the sloped roofs and domes are not just aesthetic choices, but deliberate architectural features optimized for energy generation and environmental efficiency. The concept emerged from a multidisciplinary approach, combining principles of sustainable design, renewable energy engineering, and visual harmony.

Our goal was to design a pavilion that is more than just a space—it’s a living system that interacts with its environment. That’s why the tops of the roofs and domes are designed to host solar panels and drainage systems. Every architectural element plays a dual role: to create a welcoming and beautiful structure, and to serve a practical purpose in harvesting solar energy or managing water flow. This approach allowed us to rethink traditional architecture and make every surface contribute to the pavilion's overall efficiency.

Experiencing the pavilion will be a unique blend of visual elegance and quiet technological innovation. Visitors will walk through a space that is calm, organic, and thoughtfully designed, while being subtly surrounded by clean energy infrastructure. The sloped surfaces, skylights, and curved forms invite natural light and airflow, creating a refreshing atmosphere inside. At the same time, people will be able to observe how architecture can directly interact with nature to generate power. Interpretive signage or interactive displays could explain how solar energy is being captured in real-time, turning the installation into an educational experience as well.

In terms of materials, our design emphasizes sustainability and local sourcing. We aim to use renewable and recycled materials wherever possible, such as FSC-certified wood, recycled steel, and sustainably manufactured photovoltaic panels. By sourcing materials regionally, we minimize emissions from long-distance transportation. While the production of solar panels involves some environmental impact, their long-term benefits far outweigh the initial costs. Over time, the clean electricity they generate helps offset the embodied energy used in their creation. Our water drainage systems will also utilize recyclable components to ensure environmental responsibility at every level of the build.

Beyond producing kilowatt-hours of clean electricity, our design offers multiple community co-benefits. First and foremost, it serves as an inspiring model of eco-conscious construction and can educate the public about renewable energy and sustainable living. It can host workshops, exhibitions, and community events, becoming a hub for environmental education and dialogue. The pavilion can also enhance the local quality of life by providing a shaded, energy-efficient public space for gathering and rest. In doing so, it promotes social inclusion and raises environmental awareness, while directly contributing to the transition toward a more sustainable future.

1. **Technical Narrative**

Our design incorporates several sustainable technologies, with a focus on photovoltaic (solar) panels and integrated rainwater drainage systems. The solar panels are installed on the tops of sloped roofs and domes, which are specifically oriented and angled to maximize sunlight exposure throughout the day. This technology was chosen for its efficiency, reliability, and compatibility with our architectural vision. Additionally, our drainage system collects rainwater, which can be filtered and reused for landscape irrigation or gray water purposes. These technologies were selected not only for their environmental benefits but also for their ability to integrate seamlessly with the pavilion's form, allowing us to combine beauty and sustainability in one unified system.

**How much energy and water does your installation generate each year?**The energy production capacity of our pavilion depends on location-specific sunlight conditions, but on average, we estimate that the photovoltaic system will generate approximately 10,000 to 12,000 kilowatt-hours (kWh) of electricity annually. This is enough to power several average homes or significantly offset the energy needs of a public structure. In terms of water collection, the sloped roofs are designed to collect up to 100,000 liters of rainwater annually in regions with moderate to high rainfall. The exact amount will vary depending on local climate, but the system is built to optimize capture and storage efficiency. Both systems contribute meaningfully to reducing dependence on external utilities and improving resource self-sufficiency.

**What are the system inputs?**The two primary natural inputs to our pavilion’s systems are sunlight and rainwater. Sunlight is absorbed by the photovoltaic panels to produce electricity, while rainwater is collected through a series of gutters and drainage channels integrated into the architectural forms. These inputs were chosen because they are renewable, location-dependent resources that can be harvested without any ongoing fuel or chemical input. The design maximizes surface exposure to these resources, turning passive environmental factors into active contributors to the pavilion’s performance.

**What are the system outputs?**

The main system outputs are clean electricity and usable water. The photovoltaic system generates direct current (DC) electricity, which is then converted into alternating current (AC) via inverters for use in lighting, powering installations, or feeding back into the grid. The rainwater system outputs filtered, non-potable water suitable for irrigation, cleaning, or other utility functions, depending on the level of filtration applied. Together, these outputs help reduce environmental impact, support sustainable operations, and demonstrate the potential of architecture to serve as a productive part of urban infrastructure.

1. **Prototyping and Pilot Implementation Statement**

Our team will approach the prototyping and full-scale implementation processes in phases, guided by collaboration, iterative design, and community engagement. At the initial stage, we will develop scaled prototypes and digital simulations to test key functional components—such as solar panel placement, drainage efficiency, structural stability, and material behavior under local weather conditions. These prototypes will help us fine-tune technical solutions and make evidence-based design decisions before committing to full-scale construction.

Throughout this stage, we will maintain close communication with local engineers, sustainability experts, and craftspeople to ensure that our solutions are grounded in practical feasibility and local context. Whenever possible, we will use local materials and fabrication techniques to both reduce environmental impact and support the regional economy.

Community collaboration is a core value of our project. During the prototyping process, we will hold a series of public workshops and feedback sessions to involve residents, educators, and local stakeholders in the project. These sessions will not only help us tailor the design to community needs but also foster a sense of ownership and shared vision. We believe that involving the public in early stages leads to better long-term stewardship and relevance.

In the pilot implementation phase, we will partner with local institutions—such as schools, cultural centers, or environmental organizations—to host and maintain the installation. Local workers and artisans will be invited to participate in the building process, gaining hands-on experience in sustainable construction methods. Educational programming will be developed around the installation to explain its systems and benefits, ensuring that it serves not only as a functional pavilion, but as a platform for learning and community engagement.

1. **Operations and Maintenance Statement**

Our design prioritizes low-maintenance systems and long-term operational efficiency. From the outset, we selected durable, weather-resistant materials and technologies that require minimal intervention over time. The photovoltaic (solar) system is designed with high-efficiency panels that include self-cleaning coatings and minimal wiring exposure to reduce maintenance needs. The rainwater drainage and collection systems use simple, modular components that can be easily accessed and cleaned periodically to prevent blockages or degradation.

To ensure reliable operation over the years, we will develop a straightforward maintenance manual and schedule, including seasonal inspections, filter replacements (if water filtration is included), and system diagnostics for the solar array. These responsibilities will be supported by a partnership with local maintenance providers and technicians, ideally trained during the pilot implementation phase. We aim to use standardized components that are easy to replace and commonly available in the region.

The local community will play a vital role in the ongoing stewardship of the installation. During the construction and educational phases, we will organize training sessions for local volunteers and facility staff, enabling them to understand the core functions of the pavilion’s energy and water systems. This knowledge empowers the community to take an active role in both monitoring and maintaining the installation.

In addition, the community’s involvement can be structured through local institutions, such as a school’s science club, a community garden group, or a civic committee, depending on the site. These groups can oversee small tasks such as keeping the panels clear of debris, checking drainage points, or reporting any issues early. This collaborative model fosters a sense of shared responsibility and helps ensure the long-term sustainability and relevance of the pavilion within its local context.

1. **Environmental Impact Assessment**

Our installation is designed to have a minimal ecological footprint and to harmonize with its surrounding environment. However, as with any built structure, there is potential for localized impact on natural ecosystems—particularly during the construction phase. Possible effects include temporary soil disturbance, disruption of local flora or fauna, and potential changes in natural water flow patterns due to the built surfaces of roofs and drainage systems.

To mitigate these risks, we propose several proactive measures. First, we will conduct a site-specific environmental assessment prior to construction to identify any sensitive species, habitats, or watercourses. Based on this assessment, we can make adjustments to the pavilion’s footprint, orientation, or foundation method to minimize disruption.

Second, we will use non-toxic, biodegradable construction materials wherever possible and avoid heavy chemical treatments or synthetic coatings that could leach into the soil or water. The drainage system will be designed to manage runoff in a controlled, low-impact way, possibly integrating bioswales or vegetated channels to support local plant life and slow water release.

Vegetation disturbed during installation will be replaced with native or drought-resistant species that support local biodiversity and require minimal irrigation. Green landscaping can also be designed to serve as habitat for pollinators or small animals, depending on the location.

During operation, the pavilion is expected to have a net-positive effect on the environment, as it generates clean energy and manages water more sustainably than typical structures. Regular monitoring of the immediate surroundings—combined with community engagement—will help ensure that any unforeseen ecological impacts are identified and addressed early.

By approaching the design holistically, we aim to create a structure that not only minimizes harm to natural systems, but actively contributes to ecological resilience in its local setting.