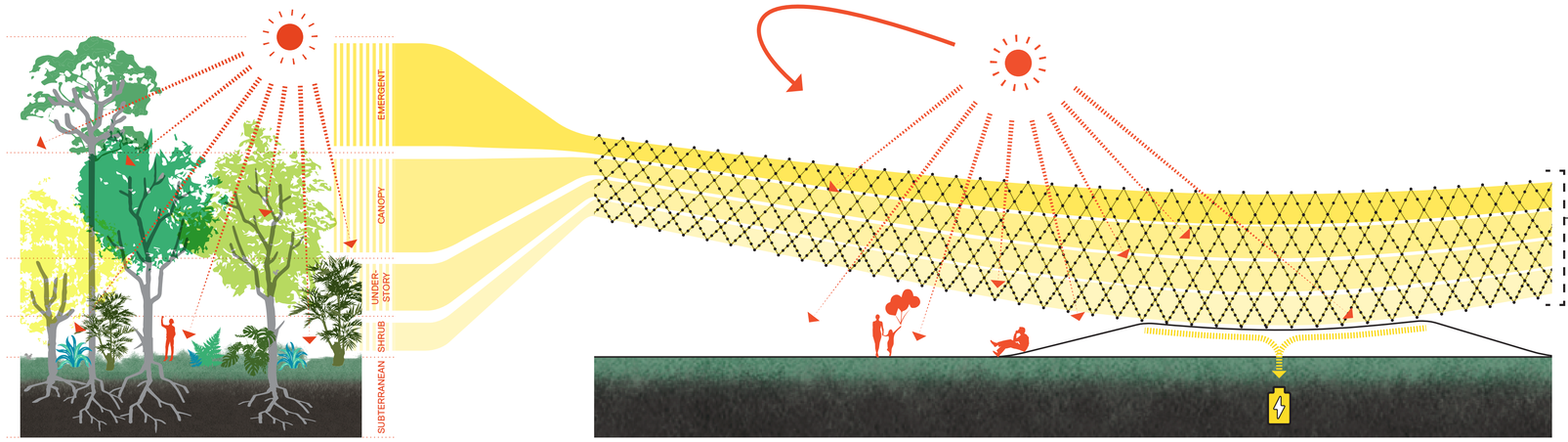
Inspired by Nature

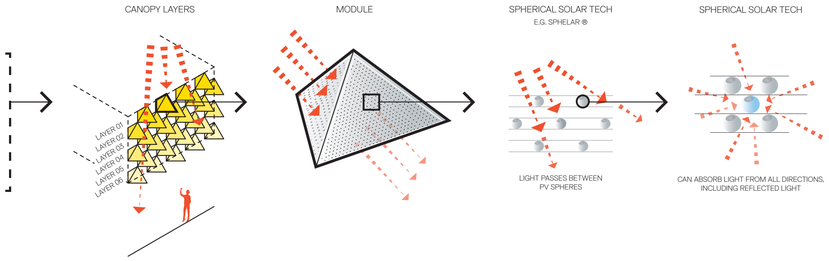
We have been inspired by how nature gathers sunlight through layers of forest canopies to implement photo-voltaic technology in an innovative, three-dimensional array. Layers of transparent, photovoltaic foliage filter energy and provide lush, dappled shade for activity and events.



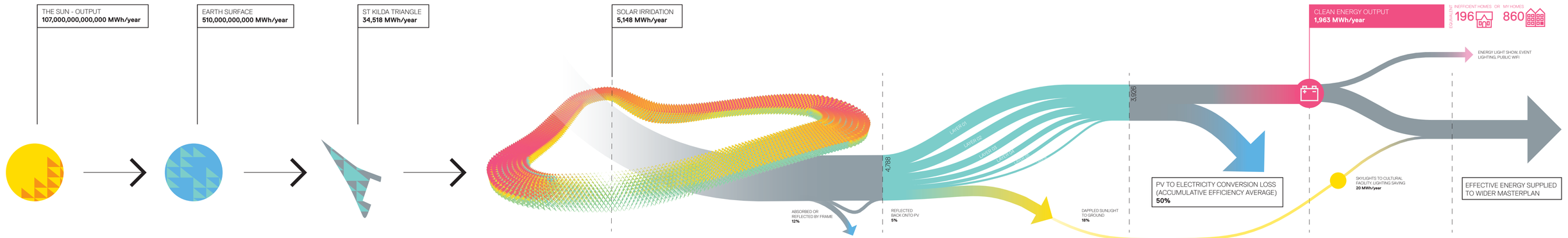
Technology

We are harnessing the power of the sun. A forest has several layers of canopy. The Halo uses this approach with multiple layers that filter the light. Sphelar ® or similar technology will allow highly efficient capture and conversion while allowing light through. Unlike traditional PV technology, triangulated panels are possible.

In the forest, the high-level leaves are small, whilst low-level ferns have large surfaces. The Halo accommodates increasing density of PV receptors at lower levels. A thorough panel-by-panel solar-analysis at a future stage will define these densities.



Energy Story



ADHERENCE TO BRIEF

- The St Kilda Halo retains key aspects of the master plan including parking, heights and key views. It looks to maximise the identity and legibility of the proposed cultural facility.
- There is a compelling demonstration of renewable technology, done in a unique, elegant and efficient manner.
- The Halo touches the ground lightly and will offset energy required to create it.
- The design is constructible using proven technologies in an innovative way.
- The St Kilda Halo will be a global and regional landmark making ecological design accessible to the people of Port Phillip and Melbourne.
- The design maximises the opportunity for human interaction with the structure and encourages people to learn about the technology and process.

SENSITIVE TO ENVIRONMENTAL (LOCAL,REGIONAL) ECOLOGIES

- The Halo is localised to the new cultural facilities roof-scape. This allows deep soil zones to be preserved and native gardens to be maximised. The proposal includes gardens to support native insect and bird populations, which are not in danger of moving parts or exposed 'live' electric elements.
- The Halo efficiently creates electricity which reduces the reliance on regional fossil fuel burning.
- The Halo encourages ecologically-conscious tourism and education, which would partner well with local ecological rehabilitation as well as community and government-led waste reduction within Port Phillip.

ADDRESSES THE PUBLIC

- The St Kilda Halo provides global attraction for Melbourne. It creates a centrepiece linking St Kilda's existing landmarks. It is a beautiful object that people will want to see and be drawn to experience.
- The design creates a strong identity and branding for the Underground Cultural Facility that it connects into.
- The Halo defines the lawn and provides needed amenity and shade. It complements large events and everyday use.
- People are encouraged to explore and learn. They can inhabit the structure and the viewing platform will provide the greatest views all summer long.
- The hardscape public realm to the front of the Palais Theatre is enhanced by this contrasting neighbour.

INTEGRATION INTO SURROUNDS

- The desig¬n works with the large-grain urban fabric. It complements the recreation uses of the lawn and slopes, alongside the fun artistic identity of St Kilda.
- The form mirrors the historic scenic rollercoaster at the nearby Luna Park.
- The Halo is a shimmering object with fuzzy edges. Viewing the structure from different angles, you'll lose sense of the edges and from some views, the object seems to disappear into the surrounds.
- The Halo links down into the underground cultural facility with a second entry and skylight to the lawns.

CLEAN ENERGY OUTPUT

- As per the diagram above. The Halo creates over 1,900MWh annually. This assumes an average accumulative efficiency of 50% using Sphelar ® solar technology.
- This is enough to power 194 inefficient homes.
- Our location analysis showed that while wind feels strong at the site, it is not regular enough to produce energy efficiently. Similarly, wave and tide conditions do not produce good output. The location is also not suitable for geothermal generation.
- The design is scalable for increase or decrease i in output.
- The St Kilda Halo works as a 'living laboratory', and as technology improves, the panels can be replaced with more efficient versions. The batteries can be upgraded with experimental technology, such as the Proton or Sea-Water solutions being developed in Melbourne.

RETURN: COMPLEXITY VS ENERGY OUTPUT

- Whilst the structure is made of many panels and framing elements, repetition means it isn't as complex as it looks. It is made of a kit of parts.
- The new solar technology that the design incorporates is more efficient than a lot of other options. It has lower embodied energy than other equivalent solutions.
- The cost for building the design must also be weighed against research and education aspects of the scheme and the eco-tourism that it will enable.

EMBODIED ENERGY

Strategies for lowering the embodied energy include:

- Local partial-manufacture and assembly of the frame and panels
- Use of lightweight panels to reduce the required structure
- A modular design for more efficient shipping
- Partnering with local researchers for next-generation battery technology which isn't reliant on depleting lithium or rare-earth minerals

ORIGINALITY + SOCIAL RELEVANCE

- Energy security and the environment are the biggest social issues facing humanity. The St Kilda Halo brings energy and the environment to the forefront of conversation. The project is successful at achieving LAGI's goal to "challenge the world to reimagine the beauty of clean energy landscapes".
- Solar power is often produced through an unappealing bolt-on skin. The Halo challenges this notion with a 3D layered array, which allows more energy to be generated while providing shade to the public realm intertwined underneath.