

Pavillion 1
Roof surface area = 68.9m²
Total Algae volume = 1.13m³

Pavillion 2
Roof surface area = 62.7m²
Total Algae volume = 1.3m³

Pavillion 3
Roof surface area = 95.8m²
Total Algae volume = 3.25m³

Pavillion 4
Roof surface area = 62.3m²
Total Algae volume = 1.95m³

Pavillion 5
Roof surface area = 68.9m²
Total Algae volume = 1.75m³



INNOVATIVE ENERGY STRATEGIES

Showcasing different innovative forms of renewable energy strategies and systems has been a focus for this design. Multiple energy systems and strategies have been brought together for the public to observe and interact with. The intent of this scheme was not so much to provide an 'energy farm' for the site that focused solely on producing the maximum amount of energy possible, but to create an engaging and interactive form of public art that encourages the public to become intrigued and learn more about renewable energy. At night the spire is lit with very low power colour changing LED lamps to encourage St Kilda's existing nightlife and continue this theme into the site and empower the 'landmark' idea of the spire, ensuring the spire can be seen from across the bay to the CBD at both day and night. Perovskite solar units wrap around the sculpture as a secondary skin to allow the abnormal form to remain whilst generating energy. Estimates indicate that the solar units in this scheme could potentially produce around 513mWh/y. This estimate suggested we could power around 74 homes at one time, or alternatively feed energy to larger public buildings and areas upon demand (etc. Luna Park, Palais Theatre, Sea Baths, bars & restaurants etc.) Algae Biomass tubes are used to frame the entry points of the site that lead into the centre of the amphitheatre. The micro algae can be used to consume the CO2 emissions from the heavy motorised traffic along the streets of St Kilda. The statistics of this product are: 1.17m³ of algae = 1 ton of CO2 that can be captured per year. The total volume of algae that the proposed design holds is roughly 49.63m³ which is equivalent to capturing 42.5 tonnes of CO2 over the course of an entire year. Pavegen kinetic tiles have been integrated throughout this design with the intention of showcasing kinetic energy strategies and how people may interact with them. The intention again was to focus on showcasing the system rather than generating great amounts of energy itself. Kinetic flooring will be used in the amphitheatre underneath the spire and throughout the public paths around the site in main traffic paths. This forms a connection between how people can generate electricity with their movement while being able to see power being generated immediately as the tiles light up and make sounds when they are stepped on. This enhances the public's connection with the amphitheatre to subconsciously become interested about how kinetic energy works and has been integrated into this scheme.

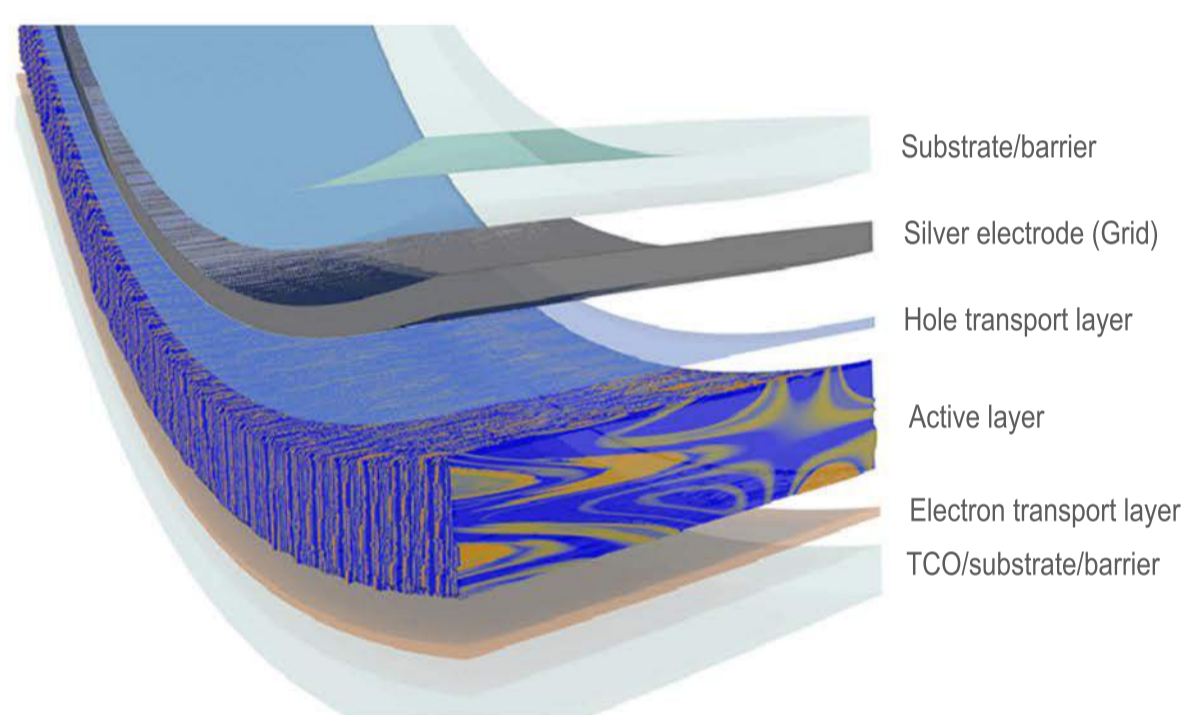
THE SYNTHESIS SPIRE

Surface area (applicable for PV units)
SPIRE = 464.5m²
SPIRE ROOF = 661.8m²
ARM = 108.8m²

Algae volume = 8m³ + 33.9m³
= 42m³ total Algae

Organic photovoltaic (OPV) film

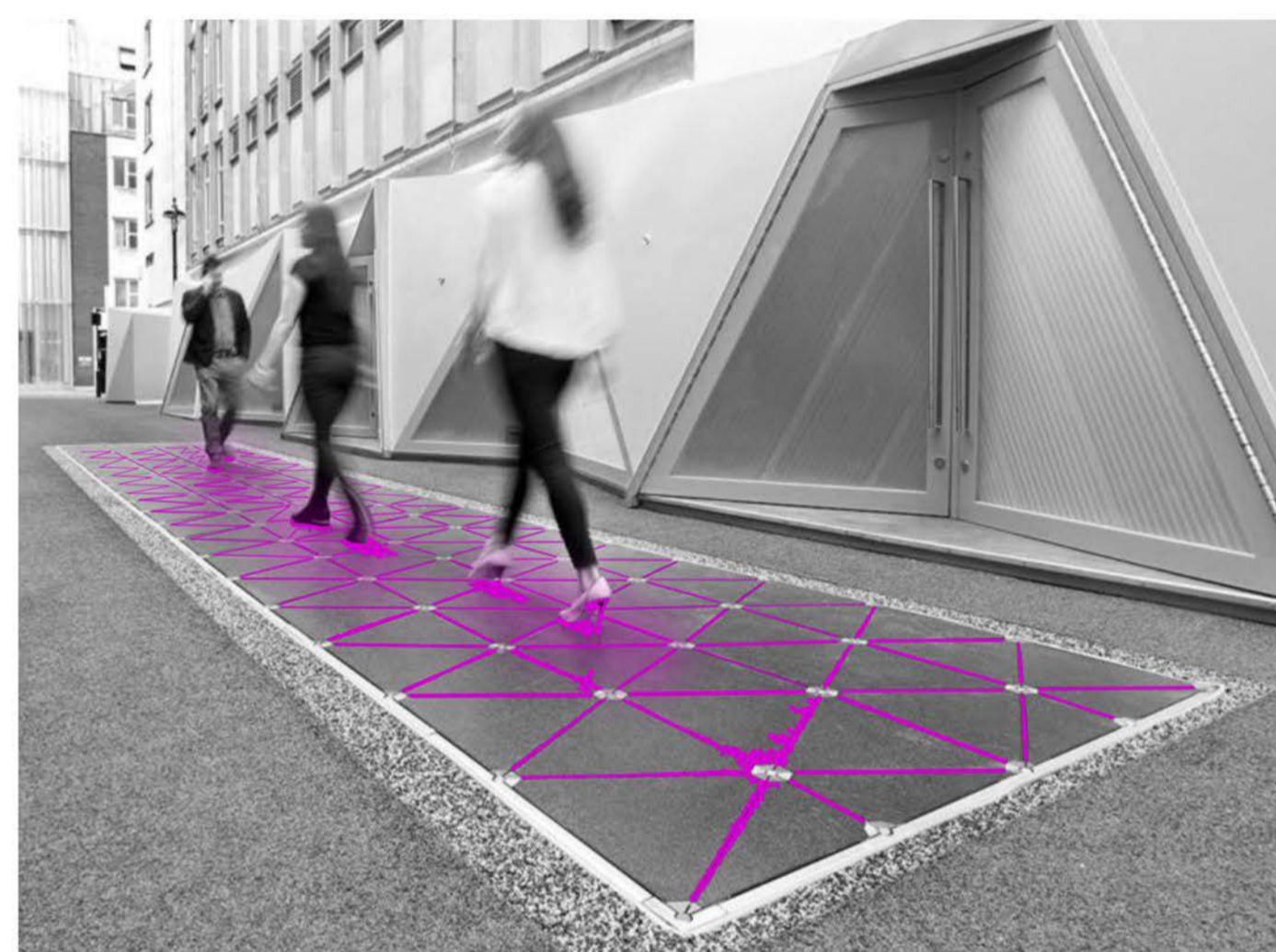
SOLAR



'Perovskite' organic photovoltaic OPV film is applied to main structure entity and smaller pavilion roofs. The organic film allows the random like form of 'the synthesis spire' to remain iconic and unique. Estimates of potential energy production through the solar systems are as indicated below:

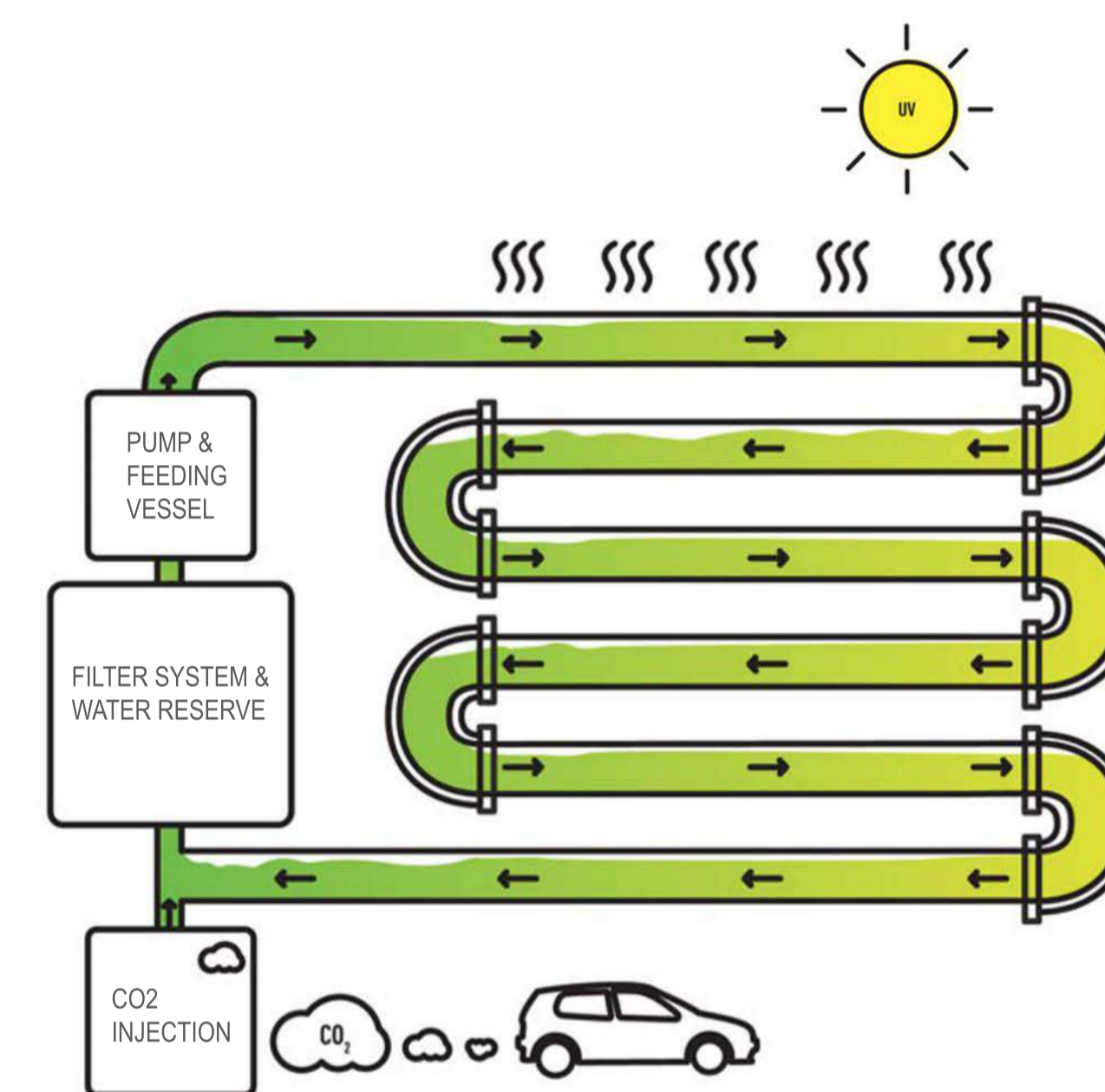
GHI	Flat		Optimal	
	Area	%	Area	%
North	0	485	98	2321.2
East	90	385	84	1579.4
South	180	392	71	1359.2
West	270	418	87	1776.0
				7035.9 kWh/d
Energy Low	Solar panel	20%	1407.2 kWh/d	513.62 mWh/y
Energy High	Daily Average	15	93.8	93 houses
Energy Average	Daily Average	25	56.3	56 houses
	Average	20	74.2	74 houses

KINETIC



Kinetic floor tiles are integrated throughout the ground plane where main pedestrian paths and traffic areas are situated on site. The main amphitheatre is where the kinetic energy is showcased to the public. This area has the capability to host events with large crowds and groups of people which is when the tiles would be most attractive. An array of colours and sounds respond to the movement of people across the tiles.

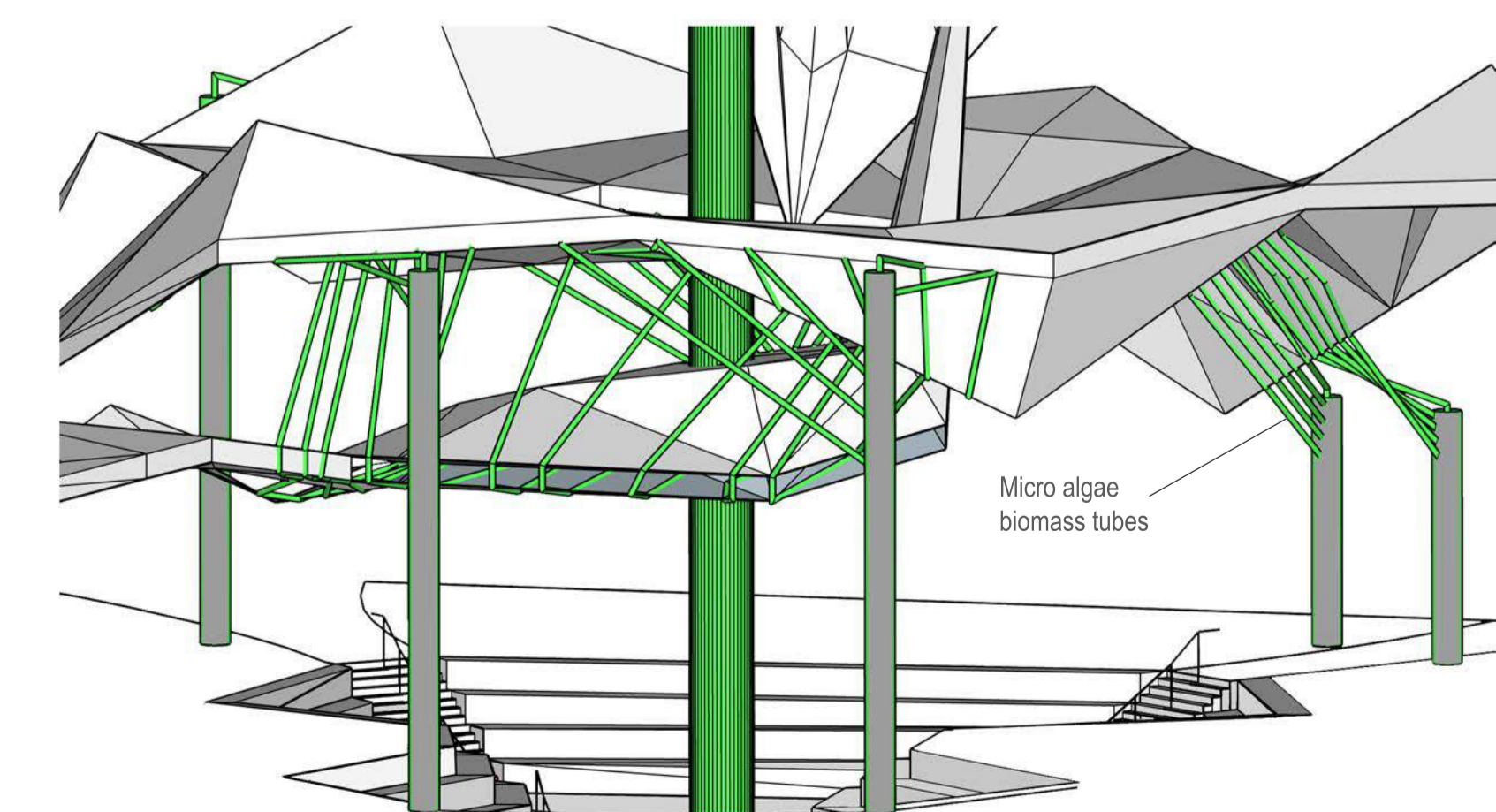
MICRO ALGAE



When the sun sets at St Kilda, the bioreactors come to life. Through the use of LED strip lighting, observers and onlookers experience a variety of colours and shapes through the algal biomass tubes that are situated throughout the site and form entry points to the main amphitheatre. The stored algae can then be either exported for energy production through the process of burning, or consumed on site as food (algae chips) like it has done so in other applications around the globe.



Estimates indicate potential to power around 74 homes (blue), or alternatively feed power to surrounding public buildings and areas (red) upon demand.



Micro algae biomass tubes

top of spire - 68m

palais theatre - 28m

spire roof - 15m

Micro algae biomass tubes

Kinetic flooring