every year helio-surf-forest will...

deliver **1,460,000 waves** returning 210,000kWh power

+ illuminate **100,000 lights** 10W 5 hours a day

+ power **970 electric cars** 15,000km

ENGINE ROOMS / FACILITIES

HELIOSTAT FOREST

RECEIVER TOWER

OBSERVATION POD

BIRD-DETERRING DRONE

BEACH

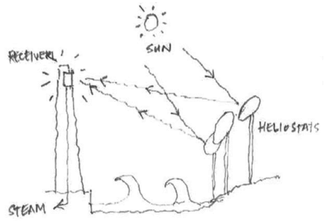
OVERVIEW

HELIO-SURF-FOREST is the integration of a 1.1MWe concentrated solar power (CSP) plant with inland surfing facility that incorporates hydro-energy recovery. A series of solar towers along the edge of a proposed urban lagoon house receivers that are fed condensed solar energy from an elevated heliostat 'forest' opposite. The receivers super-heat a sodium heat transfer fluid which is converted to steam and stored to drive a turbine that generates electricity all day and into the night. Enough power is provided to pump continuous two metre waves all year round and supply electricity to the grid for domestic and commercial use. Hydro-turbines are placed under a boardwalk on the southern side of the lagoon to recover otherwise lost energy from the waves and return further electricity to the system.

ENERGY SUMMARY

Total energy from 1.1MWe CSP solar towers:
6,200 MWh annually.

Total energy recovery from hydro-turbine:
210,000KWh annually.



LAGOON

It is proposed that the majority of the site is excavated several meters to create the lagoon which would be filled with water from abundant underground sources. This water would be treated, however desalination is not considered to be necessary. Wave making infrastructure is safely housed under a boardwalk on the southern side of the site similar to working models available in todays market. It is anticipated that currently available wave producing equipment could be adapted to be driven directly from thermal power thus minimising inefficiencies through electricity conversions. Potentially, wave generation could simply be a bi-product of the plant. The proposed wave power hydro-energy recovery system could also be used a means to store further energy for re-use during peak load evening periods.

HELIOSTAT FOREST

The configuration of the heliostat forest chellenges the conventional planar heliostat arrangement. In this proposal, heliostats are gathered to the northern side of the site rather than spreading them across the entire space. While a little unconventional, the idea of staggering heliostats vertically as well as horizontally can be seen in solar tower pit applications that utilise open cut mine sites. In those cases the sloped edges of the mine are used to mount heliostats in a way that takes advantage of existing terrain.

In our case, a simple shadow analysis reveals that significant overshadowing will occur on the southern side of the site from adjacent neighbouring buildings. Effectively, more than 50% of the site will be shaded from sunlight from 3pm for 6 months of the year (September - March). Thus, further strengthening the case to gather heliostats on the northern side of the site.

Mirrors are raised well above ground level to not only maximise usable land, but provide a shaded, grass embankment below. Automated hydraulic mounting poles extend and retract heights to avoid overshadowing from adjacent mirrors as the sun tracks across the sky. Combined with the ability to tilt up and down and left to right, all heliostats would receive maximum exposure to sunlight throughout the day. Retractable heliostats also make cleaning and maintenance more accessible when brought to ground level. Larger mirrors are formed from a series of smaller mirrors, slightly concave in shape to condense solar rays further on the target receiver tower.