

One of the world's first and largest sea water floating solar systems is set to be completed later this year. Built by Sunseap, the 5MW-peak offshore floating solar

panel system will be located along the Strait of Johor, north of Woodlands Waterfront Park. What's also unique about this system are the locally built floaters.

The Straits Times looks at the key designs of the system and the impact it will have on the pursuit of sustainable energy here and in the region.



SUNSEAP FLOATING SOLAR SYSTEM

ARTIST'S IMPRESSION

The location off Admiralty Road West is ideal as it is close to the Causeway where maritime activity is less and the waters are calmer.



NEW FLOATING MODULE

Sunseap's solar farm floater module is designed by HDB and NUS.

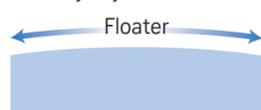
Design and testing

- HDB and the National University of Singapore collaborated on testing for the system.
- A finalised scale model consisting of about 50 units then underwent hydrodynamic testing in a wave tank.
- The design process took up to five months and the patent is still pending.
- HDB collaborated with ISO Landscape to study, develop and test a floating solar system specifically for marine conditions.
- Tests include for corrosion, movement of waves and biofouling (growth of barnacles and algae). The floaters are designed to withstand waves and ship wakes.
- The system was first used at Tengah floating solar farm.

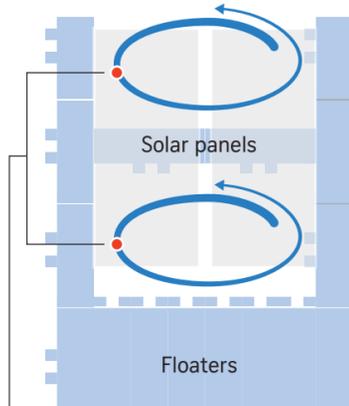
One design to rule them all.

- It is a modular system.
- Unlike existing systems which require two floater designs, the new floater requires only one design which can function as solar panel support and also as walkways, thus saving cost.
- The design allows floaters to interlock either alongside or perpendicular to one another.

The surface of the floater is curved to allow water to flow to its sides, keeping the walkway dry at all times.



TOP VIEW



SIDE VIEW

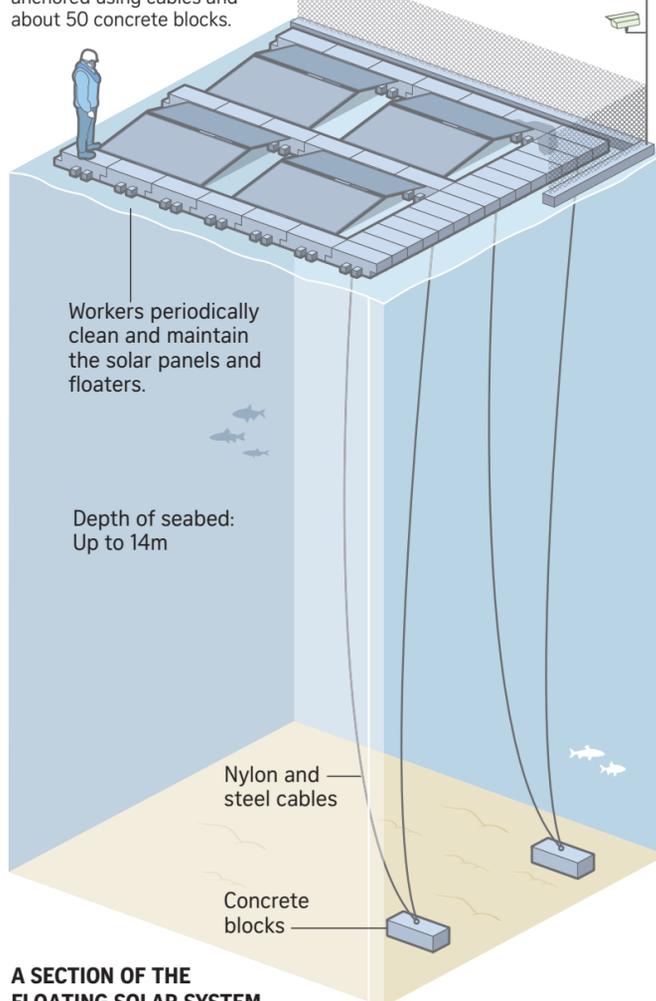


THE SOLAR FARM

Anchoring

Offshore, the system will be anchored using cables and about 50 concrete blocks.

CCTV cameras and fencing may be installed around the system.



A SECTION OF THE FLOATING SOLAR SYSTEM

ADVANTAGES

- Ideal for land-scarce Singapore, where roof space is limited.
- The project will open up opportunities for sea-based floating photovoltaic (PV) systems in the region.
- It is quiet, produces zero emissions, and requires no moving parts, water or fossil fuels to produce clean energy.
- Can be located anywhere where sunlight is abundant.

CHALLENGES

Barnacles and mussels are the bane of floating solar farms. They are crustaceans with hard shells and there are an estimated 900 species. They will grow on floaters and add to the weight of the system. Inspection and cleaning will have to be done periodically to control the proliferation of barnacles.



BY THE NUMBERS



2,600-tonne reduction in greenhouse gas emissions yearly



Can generate 5MW-peak per day under ideal conditions



30,000 floaters



Able to generate about 6,000MW-hours per year



Energy generated can power 1,250 four-room HDB flats

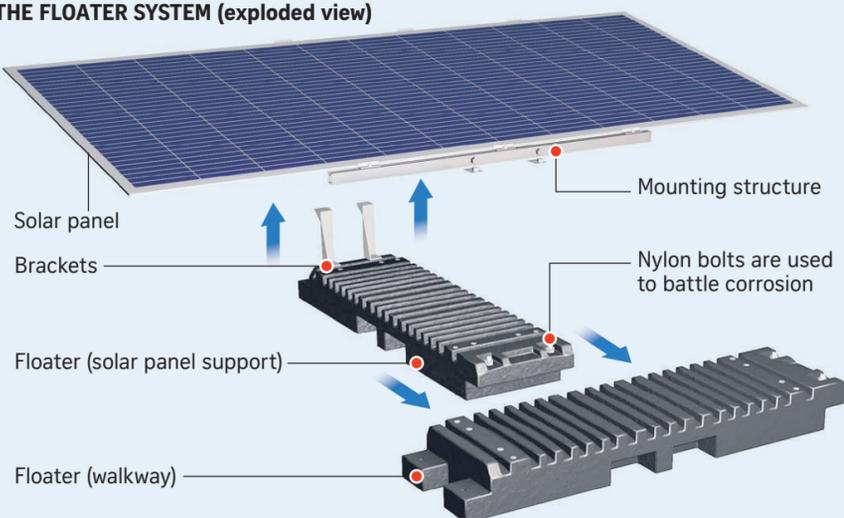


System can last 25 years or more

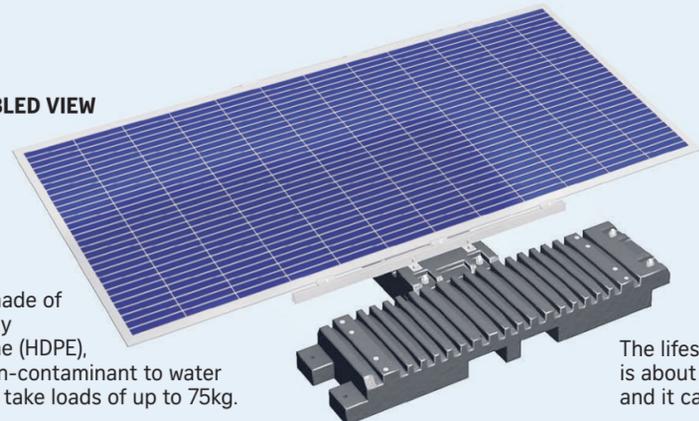


5ha floating system, roughly the size of five football fields.

1 THE FLOATER SYSTEM (exploded view)



2 ASSEMBLED VIEW



Floater is made of high-density polyethylene (HDPE), which is non-contaminant to water and able to take loads of up to 75kg.

The lifespan of a floater is about 20 to 30 years and it can be recycled.