

Blueprint for the Future

Construction Journey of Sembcorp Tengeh Floating Solar Farm

As the largest inland floating solar farm ever attempted in Singapore, there was no prior experience that the project team could tap into. Yet, this engineering marvel, completed in just under a year, was the result of an intense collaboration between several stakeholders – engineers, contractors, and consultants – all coming together to develop cutting-edge engineering and construction techniques for this project.

Every stage of the project has been carefully documented to enable effective knowledge transfer for the design, construction, operations and maintenance of future floating solar photovoltaic (PV) systems, enabling both Sembcorp and Singapore to meet regional and global solar demand.

Let's take a look at the construction journey of the Sembcorp Tengeh Floating Solar Farm.



SOIL INVESTIGATION AND PILE DRIVING ANALYSIS

These steps are essential to ensure a strong foundation for the Power Conditioning Systems (PCS) that are installed in the reservoir.



ERECTION OF TENTS AND LAUNCHING RAMPS

Tents are erected to house the solar panels and floats as well as to segregate workers into zones for safe management measures.
Ramps are also constructed at the shoreline to launch the solar panel arrays into the water using tugboats.



ASSEMBLY OF POWER CONDITIONING SYSTEM (PCS) PLATFORMS

16 platforms are set on piles above the reservoir to house the PCS. PCS plays an important part to convert electricity from Direct Current (DC) to Alternating Current (AC).



LAYING DC CABLES FROM PV MODULES TO PCS

DC cables are laid along the floating arrays, connecting the solar PV panels to their respective PCS.



LIFTING OF PCS ONTO THE PLATFORMS

Workers weld the PCS into place once they are lowered.



CONSTRUCTION BARGES DEPLOYED IN RESERVOIR

The barges, equipped with cranes, are deployed in the reservoir for the lifting operation of sinkers, PCS platforms and PCS.



CHECKING CABLE CONTINUITY

These checks along the PV module strings ensure that the solar PV panels are connected correctly per the electrical design.



CONSTRUCTION OF CONTROL BUILDING ON LAND

In the control building, engineers will run the solar farm's daily operations. It also houses a state-of-the-art digital monitoring system to monitor power output and perform routine checks remotely.



INSTALLATION OF SWITCHGEARS, TESTING AND COMMISSIONING

The 22kV switchgears serve as an important interface between the floating solar plant and Singapore's power grid.
After installation of the switchgears, testing and commissioning of various sub-systems are carried out to ensure the installations are done according to design, as well as local regulations & standards.



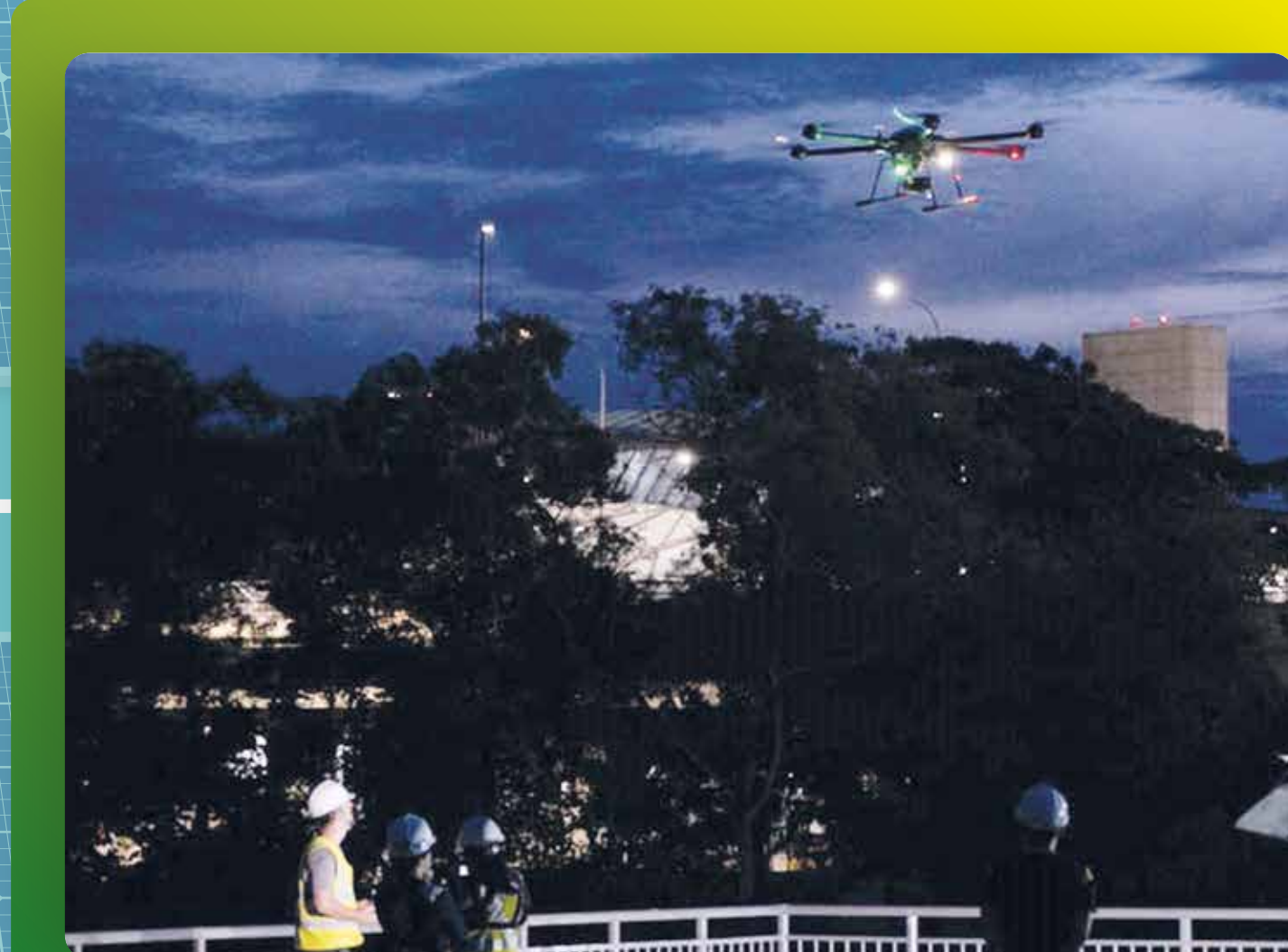
DRONE TECHNOLOGY FOR REMOTE INSPECTION

Drones are used for regular operations and maintenance checks to ensure that the panels operate optimally. The drones cover large areas rapidly and effectively, shaving manual inspection costs by about 30%.



TURN ON OF FLOATING PV SYSTEM AND INTEGRATION WITH SEMBCORP'S MONITORING PLATFORM

Sembcorp's floating PV system connects directly to Singapore's power grid, providing green electricity.
With Sembcorp's digital monitoring platform, Sembcorp engineers monitor the renewable energy output of the system in real time.



ELECTROLUMINESCENCE (EL) INSPECTION TEST

Sembcorp Tengeh Floating Solar Farm is the first in the world to deploy EL test on a utility-scale PV system to identify defective solar panels for replacement, ensuring that the system runs in optimal condition.

Significant Construction Milestones