

JOINT PRESS RELEASE

SEMBCORP AND PUB OFFICIALLY OPEN THE SEMBCORP TENGEH FLOATING SOLAR FARM

Singapore, July 14, 2021 – Sembcorp Floating Solar Singapore, a wholly-owned subsidiary of Sembcorp Industries (Sembcorp), and National Water Agency PUB, have officially opened the Sembcorp Tengeh Floating Solar Farm at the Tengeh Reservoir today. With 122,000 solar panels spanning across 45 hectares (equivalent to about 45 football fields), the 60 megawatt-peak (MWp) solar photovoltaic (PV) farm is one of the world's largest inland floating solar PV systems.

2 The commencement of the solar farm's operations marks a significant step towards enduring energy sustainability in water treatment, making Singapore one of the few countries in the world to have a 100% green waterworks system while contributing to the national goal of quadrupling solar energy deployment by 2025.

3 The electricity generated from the solar farm will be sufficient to power Singapore's five local water treatment plants, offsetting about 7% of PUB's annual energy needs and reducing PUB's carbon footprint. This is equivalent to powering about 16,000 four-room HDB flats and reducing carbon emissions by about 32 kilotonnes annually, the same as taking 7,000 cars off the roads.

4 The launch ceremony was officiated this morning by Guest of Honour, Prime Minister Lee Hsien Loong; Minister for Sustainability and the Environment, Ms Grace Fu; Permanent Secretary of the Ministry of Sustainability and the Environment, Mr Albert Chua; together with Chairman of Sembcorp Industries, Mr Ang Kong Hua; Chairman of PUB, Mr Chiang Chie Foo; Group President & CEO of Sembcorp Industries, Mr Wong Kim Yin; and Chief Executive of PUB, Mr Ng Joo Hee.

5 A new logo created based on PUB's iconic "Make Every Drop Count" water droplet (**Refer to Annex A**) was unveiled at the event to mark this achievement of a fully green water treatment system. The droplet features an iconic sun and rays of sunlight to highlight how clean water is now produced from clean energy. It signifies PUB's commitment to combat climate change by ensuring end-to-end sustainability in its operations, contributing towards the sustainability goals under the Singapore Green Plan 2030.

6 Mr Ng Joo Hee, Chief Executive of PUB, said: "With this floating solar power plant, which we believe to be one of the largest in the world, PUB takes a big step towards enduring energy sustainability in water treatment. Solar energy is plentiful, clean and green, and is key to reducing PUB's and also Singapore's carbon footprint."

7 Mr Wong Kim Yin, Group President & CEO of Sembcorp Industries, said: "The Sembcorp Tengeh Floating Solar Farm is a crown jewel in our portfolio, and a showcase for Singapore. As the leading homegrown renewable energy player, Sembcorp has over 3,300 megawatts of renewable energy assets around the world. We are committed, and have the track record and competencies, to support the Singapore Green Plan."

Driving Operational Excellence through Innovation

8 Construction of the floating solar PV system commenced in August 2020. Designed, built, owned and operated by Sembcorp, the project was completed on time with full safe management measures in place, despite manpower and supply chain constraints due to the unprecedented COVID-19 pandemic. (**Refer to Annex B** for the construction journey of the Sembcorp Tengeh Floating Solar Farm)

9 New and innovative ways of working were needed to mitigate the impact, and one such way was conceptualising and implementing a new engineering and construction technique to design a custom-built jig that increased the rate of solar panel assembly by up to 50%.

10 Partnering with Quantified Energy Labs, a technology spinoff from the National University of Singapore, this project is also the first in the world to deploy advanced drone electroluminescence imaging technology on a utility-scale PV system. Drone electroluminescence imaging captures X-ray-like signals emitted by PV modules to accurately and rapidly pinpoint defects that could be caused by a variety of factors from the manufacturing to installation stage. Identifying and replacing defective modules from the start has ensured that the PV system is running in optimal condition.

Ensuring Water Quality and Mitigating Environmental Impact

11 PUB's main concern with deploying solar panels on reservoirs was the potential impact on surrounding environment, biodiversity and water quality. A comprehensive Environmental Impact Study, which included biodiversity surveys, water quality monitoring and modelling, along with consultations with nature groups was carried out between 2015 to 2018. Results from PUB's testbed deployed at Tengeh Reservoir in 2016 showed no observable change in water quality nor significant impact on surrounding wildlife.

12 Referencing the Study, the Sembcorp Tengeh Floating Solar Farm was carefully designed to minimise impact on the reservoir's water quality, flora and fauna. Sufficient gaps between solar panels were incorporated to improve the airflow and allow sufficient sunlight to reach aquatic life. Additional aerators were also put in place to maintain oxygen levels in the reservoir.

13 Floats deployed are made using high-density polyethylene (HDPE) - a certified food-grade material that is recyclable, UV-resistant and corrosion resistant. In addition to having a comprehensive environmental management and mitigation plan, PUB and Sembcorp will continue to monitor the reservoir closely, and take necessary measures to maintain biodiversity and water quality.

14 Sembcorp aims to continue to innovate and deepen its capabilities in renewable energy such as solar, wind and energy storage, to be a leading provider of sustainable solutions.

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ABOUT SEMBCORP INDUSTRIES

(Company registration: 199802418D)

Sembcorp Industries (Sembcorp) is a leading energy and urban solutions provider, driven by its purpose to do good and play its part in building a sustainable future.

Headquartered in Singapore, Sembcorp leverages its sector expertise and global track record to deliver innovative solutions that support the energy transition and sustainable development. By focusing on growing its renewables and integrated urban solutions businesses, it aims to transform its portfolio towards a greener future and be a leading provider of sustainable solutions.

Sembcorp has a balanced energy portfolio of over 12,800MW, with more than 3,300MW of renewable energy capacity comprising solar, wind and energy storage

globally. The company also has a proven track record of transforming raw land into sustainable urban developments, with a project portfolio spanning over 12,000 hectares across Asia.

Sembcorp is listed on the main board of the Singapore Exchange. It is a component stock of the Straits Times Index and sustainability indices including the FTSE4Good Index and the iEdge SG ESG indices. For more information, please visit www.sembcorp.com.

ABOUT PUB, Singapore's National Water Agency

PUB is a statutory board under the Ministry of Sustainability and the Environment (MSE). It is the national water agency, which manages Singapore's water supply, water catchment, and used water in an integrated way. From April 2020, PUB also took on the responsibility of protecting Singapore's coastline from sea-level rise as the national coastal protection agency.

PUB has ensured a diversified and sustainable supply of water for Singapore with the Four National Taps (local catchment water, imported water, NEWater, desalinated water). PUB leads and coordinates whole-of-government efforts to protect Singapore from the threat of rising seas and the holistic management of inland and coastal flood risks.

PUB calls on everyone to play a part in conserving water, in keeping our waterways clean, and in caring for Singapore's precious water resources. If we all do our little bit, there will be enough water for all our needs – for commerce and industry, for living, for life.

CLEAN WATER
— *from* —
CLEAN ENERGY



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.



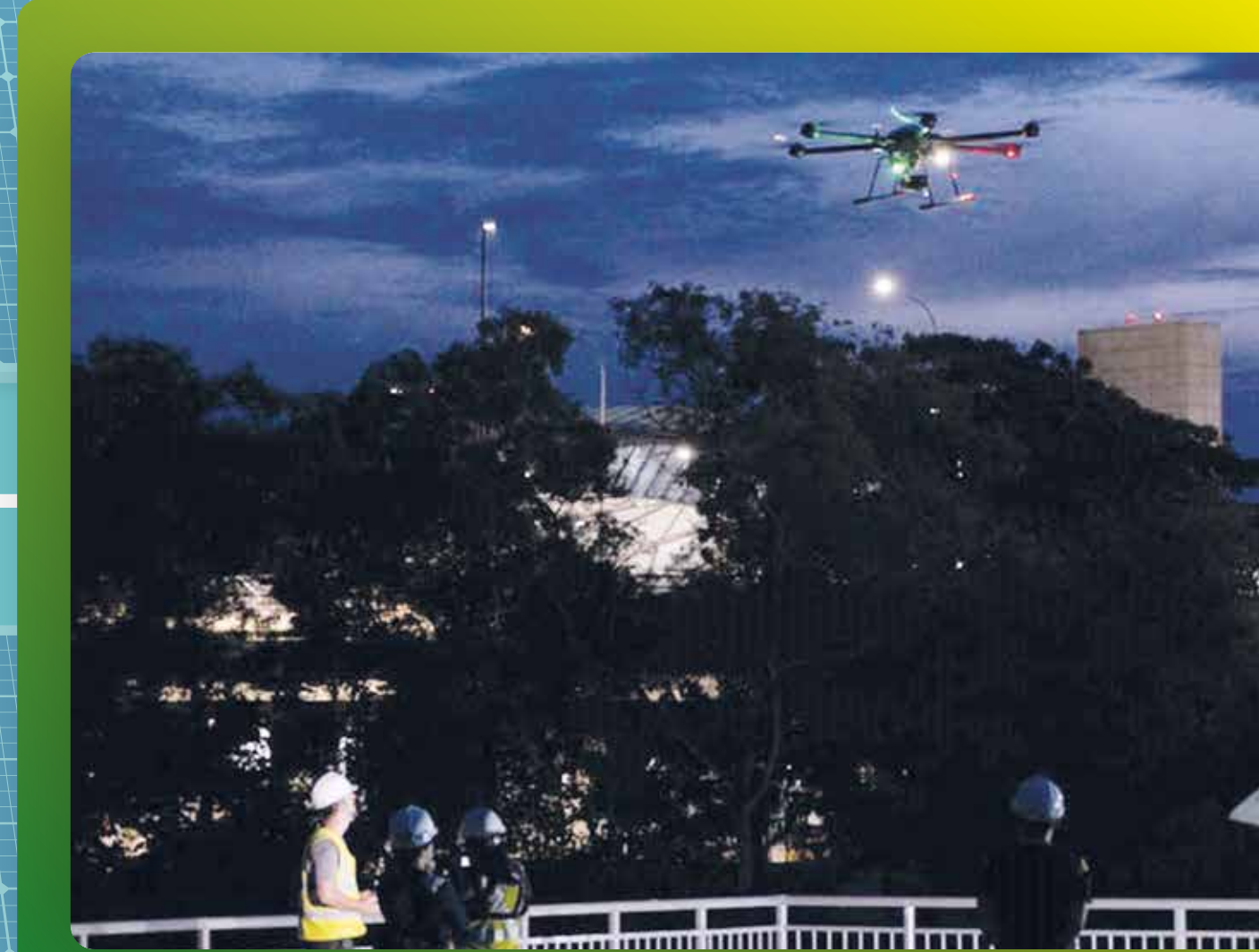
DRONE TECHNOLOGY FOR REMOTE INSPECTION

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