

 **Floating PV**

# Floating PV: A Novel Approach To Solar

A niche market has emerged within the solar industry as an alternative way to gather clean energy.

by **Bernard Prouvost**

**A**s solar power becomes increasingly affordable, accessible and prevalent around the world, new technologies and methods of installation are emerging. Specifically, floating solar PV is becoming a competitive and viable niche in the solar market that offers a water-based alternative to traditional PV installed on the ground, rooftops or carports.

Floating PV projects are typically installed on inland compounded bodies of water, be they natural or man-made. The projects consist of a floating mounting system, which has a framing structure equivalent to a standard ground-mounted PV system that is used to support the PV modules above the water with consideration to a set pitch, azimuth and distance.

Installation is surprisingly straightforward. First comes the assembly of the floating structure. On shore, modular Lego-type floats are assembled into rows using connection pins - each one of these "main floats" supports a PV module. The rows are held together by aisles of secondary floats, which ensure the overall structure's buoyancy and spacing between the PV panels, as well as double as maintenance alleys. PV panels are installed, and the structure is simply pushed out or towed into the water. As the solar island is being assembled, anchors are installed on the perimeter banks or at the bottom of the body of water in which the system will be placed.

The floating structure is anchored via mooring lines, which are adaptable to water level fluctuations, and cabling is put into place. Anchoring is a major component of any floating solar project, and accurate bathymetric information is crucial

to the design of a long-lasting power plant. The entire system must be designed to withstand long-term environmental hazards, such as rain, snow and wind conditions. Wind has the strongest incidence on the structure's integrity and should be a design priority for any floating PV project. All electrical components must be strong enough for intense wind conditions, as well as waterproof, resistant to dust and able to function reliably in extreme temperatures.

A floating PV system is cabled in the same way as ground-mounted systems, except that the junction boxes (NEMA 4 X minimum) mounted on the floating arrays are connected to onshore inverters using either a flexible marine DC cable or normal DC cable protected in an adapted waterproof and sealed floating conduit. The main electrical equipment is located on the embankment for easy and safe maintenance at all times.



*Photo courtesy of Ciel et Terre*

## Market applications

Floating PV systems can be installed for self-consumption by private or public entities to offset their on-site electrical needs (e.g., pumps, aerators, factories, refrigerated warehouses, etc.), or the electricity generated can also be fed into the grid and sold to local electric utilities.

Floating solar is ideal for energy- and water-intensive industries, such as water treatment plants and reclamation facilities. Industries using large quantities of water as part of their plant cooling process (e.g., steelworks), which tend to be energy-hungry, may also find a perfectly adapted renewable energy solution in floating PV.

Wherever conserving land is a concern, as for agricultural

