

Floating solar fields

Solaris Synergy has developed a floating PV system that enables owners of water surfaces such as irrigation reservoirs to put their reservoirs to work, providing clean and cheap power

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The decreasing cost of PV solar panels has brought the promise of renewable solar energy closer to many users world-wide; however, the shortage of available land for deploying solar fields has up until now presented a challenge limiting the spread of solar energy generation in many regions.

The use of water surfaces for solar energy generation has been experimented with for a number of years, but it is only in the last year there has been a tremendous surge of interest in floating PV solutions and today there are already a number of installations of several Megawatts each and many more in the pipeline.

Leveraging the water surface to enable simple and low-cost construction, Solaris Synergy has developed a novel floating PV system that enables owners of water surfaces such as irrigation reservoirs, hydro-dams etc. to put their reservoirs to work, providing clean and cheap power. The technology has been proven in a 50kWp demonstration plant in a reservoir belonging to "Mekorot" (the Israeli water utility) that has been operational continuously for over a year with excellent results.

Floating PV systems offers a number of advantages over the installation of PV panels on land or rooftops. Benefits

include an increase in conversion efficiency due to the water's cooling effects, a reduction in evaporation and algae growth resulting from the shade provided by the panels and, perhaps most importantly, these industrial and agricultural bodies of water provide inexpensive real estate on which to install solar panels.

Given the benefits outlined above the use of water surfaces to float PV panels seems advantageous, however there are significant technical challenges that need to be overcome in order to design and construct practical and cost effective systems.

The lack of a solid "ground" mounting requires creative solutions to cope with wind and wave forces, which may amount to several tons impacting on the system, thereby constantly causing variations in the water surface levels of many meters in height,

Solaris addresses these challenges with a patented design based on the concept of a flexible floating-grid, constructed



Installation Process: The installation of the floating tension ring that hold the stainless steel wire grid

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Floating Bridge: Floating Service Bridge for Module cleaning and maintenance

from stainless steel cables, wherein the panels float individually on separate frames. This open structure allows for gaps in the water body and so prevents interference with aquatic life in the reservoir or lake.

The frames that hold the PV panels and their supporting floats are designed to enable the panels to adapt to changing wind conditions by automatically adjusting the panels' tilt angle, thus reducing the "sail" effect of the panels and allowing the system to withstand wind-speeds up to hurricane force. The inherent flexibility of the floating cable grid can accommodate wave heights of over a meter and the system is capable of coping with extreme changes in water levels. The floating grid structure is designed to allow the passage of a small floating service gantry for routine maintenance. A unique anchoring system has also been developed which enables the Solaris system to be installed on water bodies of any size from small irrigation reservoirs up to large lakes.

Another challenge is the close proximity to water, which may affect the long term reliability of some of the components, and so requires that all the materials used in the system to be compatible with the aqueous environment and be compatible with the aqueous environment and prevent contamination of the water.

In the system, all components that come in contact with

the water are made of 316 stainless steel and Polyethylene foam and are non-corroding and non-contaminating. The PV panels are guaranteed by the manufacturers for safe operation in water installations.

Work is currently in progress on the development of low-cost panel cooling, sun tracking and automated panel cleaning systems, which together with the low-cost structure design will make the installation and operation of the Solaris system cheaper than other floating systems as well as competitive with land-based installations thus providing clean energy at below grid parity. 💧



General View of the Eshkol installation