

Solaris Synergy (Israel) Ltd.
A leader in the provision and operation of Floating PV Solar systems

Abstract

The decreasing cost of PV solar panels has brought the promise of clean renewable solar energy closer to many users world-wide; however the shortage of available land for deploying solar fields has been one of the challenges which have, so far, limited the spread of solar energy generation in many regions. Mounting solar panels on water surfaces has, up until now, been an expensive and complicated process.

The new Solaris Synergy FPV (Floating Photo-Voltaic) technology breaks this paradigm by providing Solar electric generation on water surfaces at a cost equivalent to grid-parity and competitive with ordinary land based systems!

Leveraging the water surface to allow the use of simple and low-cost construction, Solaris Synergy has developed a novel system for Solar generation of electricity that enables owners of water surfaces to put their reservoirs, Hydro-electric dams, lakes and ponds to work, providing clean and efficient power.

The technology has been proven in an operational plant in the North of Israel belonging to Mekorot the Israeli water utility company and is currently in the process of a large scale installation. Solaris Synergy is one of a very few number of companies worldwide able to offer a commercial floating PV solution, and the only one to do so at a competitive cost with land based installations.



The Solaris Synergy installation on the Eshkol reservoir, Israel

In recognition of the Solaris Synergy technology, the company has been chosen to participate in the first phase of the largest side-by-side comparison of floating solar PV systems carried out to date world-wide. The project is being undertaken by the government of Singapore and is managed by the Solar Energy Research Institute of Singapore (SERIS), Asia's leading applied research institute for solar energy outside of Japan. This SGD11 million project will be held in two phases over a period of 4 years, and in phase one, starting in 2015, will deploy eight floating PV systems, each with a capacity of around 100 kWp. Phase Two, which commence after the PV systems of Phase One have been comparatively tested for several months, will see an expansion by another 2-3 MWp in size. More details can be found on the SERIS website <http://www.solar-repository.sg/>

Target Market Segment

Solaris Synergy's solution is targeted at the owners of water surfaces. These are many and varied and include among others, Power Utility providers (Cooling ponds, Hydro dams, Pumped Water facilities, etc.), Water Utility providers, Farming communities, Fish Breeders, etc.

Key Advantages of the Solaris Synergy System

- Utilization of available inland water surfaces
 - ✓ Added source of income for reservoir owner
 - ✓ Does not interfere with current use of water body
 - ✓ Actually benefits the water body through reducing water losses by evaporation and inhibiting algae growth
 - ✓ Minimal Water/PV-system interface - does not reduce aeration of the water body
 - ✓ Eliminates the need for using precious land resources, re-zoning, permitting etc.
- Flexible and compliant construction allowing use in high-wind or high-wave locations
- Low Total Cost of Ownership - Competitive prices and low maintenance and running costs

A Typical Project

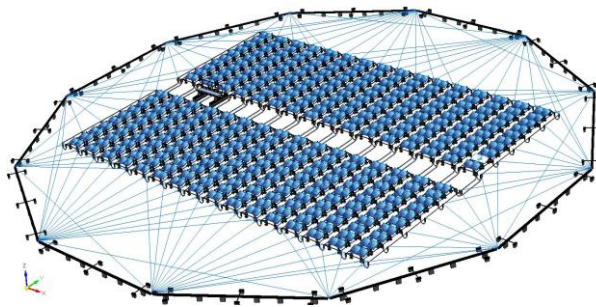
A typical project of the type described above, would include the design, construction and commissioning of a floating PV installation where, in most cases, Solaris Synergy would provide the technology, design, and project management while employing a local subcontractor for the actual construction, installation and commissioning work under Solaris Synergy supervision. In other cases Solaris Synergy may only supply the technology and subcontract the actual project work to a local EPC company.

Typically the Operation and Maintenance of the system would be performed by a Solaris Synergy certified third party subcontractor.

Technology

In the past, a number of floating PV systems were developed in response to the need for solar generated electricity in regions where land wasn't freely available. These systems utilized either a rigid construction supported on the bottom of the water body, or a rigid contiguous floating platform. Unfortunately both of these approaches suffered a number of inherent drawbacks. For example, the rigid constructions supported on the water bed were not only expensive, but imposed a practical limit on the depth of the water body on which they stood and were unsuitable for reservoirs where the water bed was lined. Attempts to build rigid floating platforms required very strong construction and anchoring designs where used in areas with significant wind or wave action and were, as a result, expensive to construct.

The Solaris Synergy technology, protected by a number of patents, provides a solution to these challenges through an innovative approach to the design of the system. In this solution, the PV modules float independently of each other while maintaining a predefined geometrical configuration by means of a proprietary system of tensed cables connected in a spider-web like grid and supported by a rigid floating rim. Imagine a structure similar to a tennis racquet, where the floating rigid rim is the frame of the racquet, and the grid of tensed cables are the strings of the racquet running lengthwise and width wise. In the squares formed by the criss-crossing strings – the solar panels are placed and are loosely held to the corners of the squares with cables.



The Grid-Based Solaris Synergy system

The technology, allows the incorporation of any standard PV module hence allowing the owner to benefit from the lowest cost and best performance PV modules on the market. The system has a unique method of floatation, which allows each panel to automatically adjust to wind loads independently of the others in contrast to rigid floating platforms in which stresses accumulate across the entire PV array. This as well as a patented cable-based structure enables the cost of the system to be significantly lowered while being able to sustain hurricane level winds. Simultaneously the system's open construction maintains water aeration while still providing sufficient shade to reduce water evaporation and undesirable algae growth, and yet enabling indirect light to reach the water body. The system has an option to be anchored in place from the shore or from the bottom of the water body in such a way as to be unaffected by changes in the water level while continuing to maintain the integrity of any bottom-liners in reservoirs where they may be present. Maintenance to the system is provided by means of a custom-designed floating platform capable of traversing the array of modules.



Close-up of the panel floatation system