Water Resource Management
Floating Solar Cover
Water storage and power production
Solution for rural areas

In order to prevent evaporation from open water reservoirs, a floating cover can be installed. The second important function of covering, is to change the water condition from aerobe to anaerobe, which decisively improves the hydro-biological quality. Open water reservoirs are used as hydraulic buffers for farming, respectively irrigation and the storage of different kind of water, such as surface, secondary treated, sewage and potable water.

The special UV light and tear resistant cover allows a lifetime of more than twenty years. Due to the unique tensile strength, the usage of the cover area as walking and working platform makes the installation and operation very easy. Flexible thin film photovoltaic panels are laminated on industrial scale on lanes in a roll-to-roll mode. Depending the reservoir size, small PV power plants ranging from 500 kWp up to 5,0 MWp are installed.

Turning dryland into farmland
Technology integration

Advantages at a glance
> Decisive improvement of the hydro-biological water condition
> Double use of land, saving of agricultural area
> No additional infrastructure expenses for land preparation, fence, access roads, electrical connections
> No additional building permission
> Prevention of evaporation
> Prevention of dirt and dust from outside the environment

Renewable energy
> Flexible CIGS thin-film panels
> In-house sandwich lamination on industrial scale
> Installation along with the floating cover
> Easy to clean due to water availability

Economic conditions
> Photovoltaic amortization due to local sun radiation from 8 years on
> 20 years system lifetime
> Ideal for net-metering
> Grid independent local electric power production
> Installed capacity about 500 kWp per 10.000 m²
> Resistant to wind
> Shatter-proof – won’t break if struck by debris
> Modules are naturally cooled by the water for better performance
> Fewer shading issues than rooftop solar
Renewable energy
Sustainable water and power solution

The energy yield
Electric power production by photovoltaic will become one of the most important technologies of the coming years. Photovoltaic systems create no emissions, have no turning parts, produce no noise and can easily be removed at the end of the life time. The operational character shows over the day and over the year a continuously changing power volume. As a stand-alone system, the receiving power consumer has to work in a batch mode and only in daytime, unless an energy storage device is connected. Net-metering, which communicates with the public grid by feeding and receiving electric power based on a commercial scheme, allows the consumers continuous operation. In the field of water technologies, these consumers are usually pump stations, filtration, or membrane systems. The chart on the righ shows a typical energy yield gradient over one year.

Water management
A comprehensive water management is the best answer to water scarcity and expanding dryland areas. Losses by water evaporation worsen the need of water. Many countries ban the use of potable water for irrigation or industrial processes. Agriculture and industry depend on reclaimed water. Covering water ponds and reservoirs provide an important contribution to a professional water management. Data as shown in the table 1, show exemplary water losses by evaporation.

Material properties

<table>
<thead>
<tr>
<th>Description</th>
<th>Oty.</th>
<th>Unit</th>
<th>Material</th>
<th>Dimension</th>
</tr>
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<tbody>
<tr>
<td>FLEX-02W PV Module, 360 Wp</td>
<td>700</td>
<td>pc.</td>
<td>CIGS</td>
<td>2.598 x 1.000 mm</td>
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<tr>
<td>Thickness, module</td>
<td></td>
<td></td>
<td></td>
<td>2.5 mm</td>
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<td>Thickness at J-box</td>
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<td>17.0 mm</td>
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<tr>
<td>Weight</td>
<td></td>
<td></td>
<td></td>
<td>5.1 kg</td>
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<td>Junction box protection call</td>
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<td></td>
<td>IP68</td>
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</tr>
<tr>
<td>Cable connections</td>
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<td>Amphenol H4</td>
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<tr>
<td>Cell type</td>
<td></td>
<td></td>
<td>Copper, Indium, Gallium, Diselenide (CIGS)</td>
<td></td>
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</tbody>
</table>

Image on the left: Dynactiv Power is equipped with MiaSolé FLEX-02 Modules.

Image on the right: Benecke-Kalikos Dynactiv water cover has a very high tensile strength. It’s walkable and trafficable while floating on water.

Evaporation rate, between
1.5 m³/m²/year 30,000 m³ per year
4.0 m³/m²/year 80,000 m³ per year

Compensation expenses
Reused water $ 0.25 per m³ Potable water $ 1.00 per m³
$ 7500.00 per year $ 30,000.00 per year
$ 20,000.00 per year $ 80,000.00 per year

Thermal characteristics Dim.
NOCT [°C] 48
Temperature Coefficient of PMPP [%/°C] -0.4
Temperature Coefficient of VOC [%/°C] -0.36
Temperature Coefficient of ISC [%/°C] 0.003

Electr. power performance at STC Dim. FLEX-02 350W FLEX-02 360W
Nominal Power PMPP [W] 350 360
Aperature Efficiency [%] 15.3 15.7
Power Output Tolerance [W] +10 / -0 +10 / -0
Maximum Power Voltage VMPP [V] 31.0 31.6
Maximum Power Current IMPP [A] 11.33 11.43
Open Circuit Voltage VOC [V] 38.8 39.3
Short Circuit Current ISC [A] 12.99 13.02
Maximum Series Fuse Rating [A] 25 25
Maximum System Voltage [IEC/UL] [V] 1000/600 1000/600
Engineering
Project planning and realization

For the planning phase Continental provide engineering support for the preparation of a feasibility study, comprising an energy yield calculation including amortization, budget determination, hydro-biological improvements, logistics and installation.