SUCCESS STORY

Efficient solar power generation through multiple land-use

Alpine solar power plants are also used by hydropower producers in Switzerland. The harsh weather conditions place high demands on the technology, and the Stäubli Original MC4 connectors are explicitly approved .

To date, Switzerland has relied on hydropower from run-of-river power plants or Alpine reservoirs to generate renewable energy. Hydropower covers over 55% of the country's overall electricity needs and, at more than 95%, accounts for almost all of Switzerland's renewable electricity production. However, the high-altitude reservoirs with their dam walls are also ideal for generating solar energy, as efficiency is higher there than in the lowlands, especially in the colder months of the year.

Efficient solar power

High-alpine solar systems are also reliable power generators in the winter because they are usually located above the fog cover. Photovoltaic modules also work more efficiently in the cold and benefit from the reflection of sunlight on the snow. This allows for three to four times higher electricity production in the winter months than at lower altitudes.

Photovoltaic systems on dam walls

Kraftwerke Oberhasli AG (KWO) is one company taking advantage of these benefits. As one of the largest hydropower producers in Switzerland, KWO has installed bifacial glass-glass solar modules on the dam walls of the Oberaar and Räterichsboden reservoirs in the Grimsel region (Bernese Oberland) at approximately1800 m and 2300 m above sea level. The bi-facial modules absorb sunlight on both the front and rear sides and convert it into energy. Together, these alpine photovoltaic systems cover an area of around 3,000 m² and in total

Renewable energy:
Original MC4-Evo 2 PV DC connector

Application: Alpine PV system

- Safe installation
- Robust, weather-resistant connection with IP68 degree of protection
- Long-lasting, loss-free energy transmission

generate around 550 kWp of power (maximum output).

The annual 600 MWh of solar power is transmitted by Stäubli MC4-Evo 2 photovoltaic connectors and used by the large Swiss retail distributor Migros through a PPA (Power Purchase Agreement). This PV system project presents two new challenges for KWO. Firstly, this method of electricity production using photovoltaics at an alpine altitude is a first for KWO. The electricity produced is also marketed directly via PPA and is not fed into the public grid.

Safe and quick connector installation

The local conditions for the module installation in this project meant they required pre-assembled cables on the PV connectors. Together with the engineering company in charge, Stäubli defined and developed a solution tailored specifically to these requirements. The Stäubli PV connectors were pre-assembled with extension cables from the Stäubli eBOS (electrical Balance of System) product range. The 1 m long extension cables with a diameter of 6 mm2, which were customized to the system, made installation at great heights on the dam walls much easier, as there was no need for crimping on site. The fact that the cable assemblies did not have to be made on-site under “real construction site conditions” made it easier to meet the quality requirements. The time saved during installation plus the TÜV Rheinland (IEC) and UL-certified MC4-Evo 2 connectors were decisive arguments in favor of the Stäubli solution.

The project manager for Power Plant & High-voltage Technology at Kraftwerke Oberhasli, Marcel Schläppi, confirms: **“Together with our engineering company and the Stäubli employees, we developed a customized cabling solution. Thanks to the pre-assembled connector solution with the extension cables, we were able to connect the panels more quickly on the construction site. That made our work easier.”** The pre-assembled cabling solution also allowed for a safe and high-quality photovoltaic connection installation.

The Original MC4-Evo 2 connectors are tested for use at high altitudes up to 5000 m above sea level and at temperatures from -40 °C to 105 °C. The unique MULTILAM contact technology of the connectors allows for extremely low contact resistance, which enables high contact quality and thus ensures that the cable couplers can operate reliably and with an extremely long service life.

Customer benefits

- Quality product for reliable energy transmission and safe yield
- Quick and safe installation thanks to customized cable assembly

About Stäubli

Stäubli stands for innovative mechatronics solutions in the electrical connectors, fluid connectors, robotics, and textile divisions. With over 6,000 employees, the company operates in 28 countries.

In the renewable energy sector, Stäubli Electrical Connectors has set the industry benchmark with its MC4 connector portfolio based on the reliable MULTILAM contact technology. Active in this market for more than 25 years, Stäubli creates the basis for sustainable change and connections for life.

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