

CASE STUDY PMA CABLE PROTECTION RENEWABLE ENERGY

## A pioneering solar power project

One of the world's highest photovoltaic systems delivers renewable energy.

**PMA**

PMA® cable protection products employed for maximum protection of the installation's cable connections.



Delivering power to

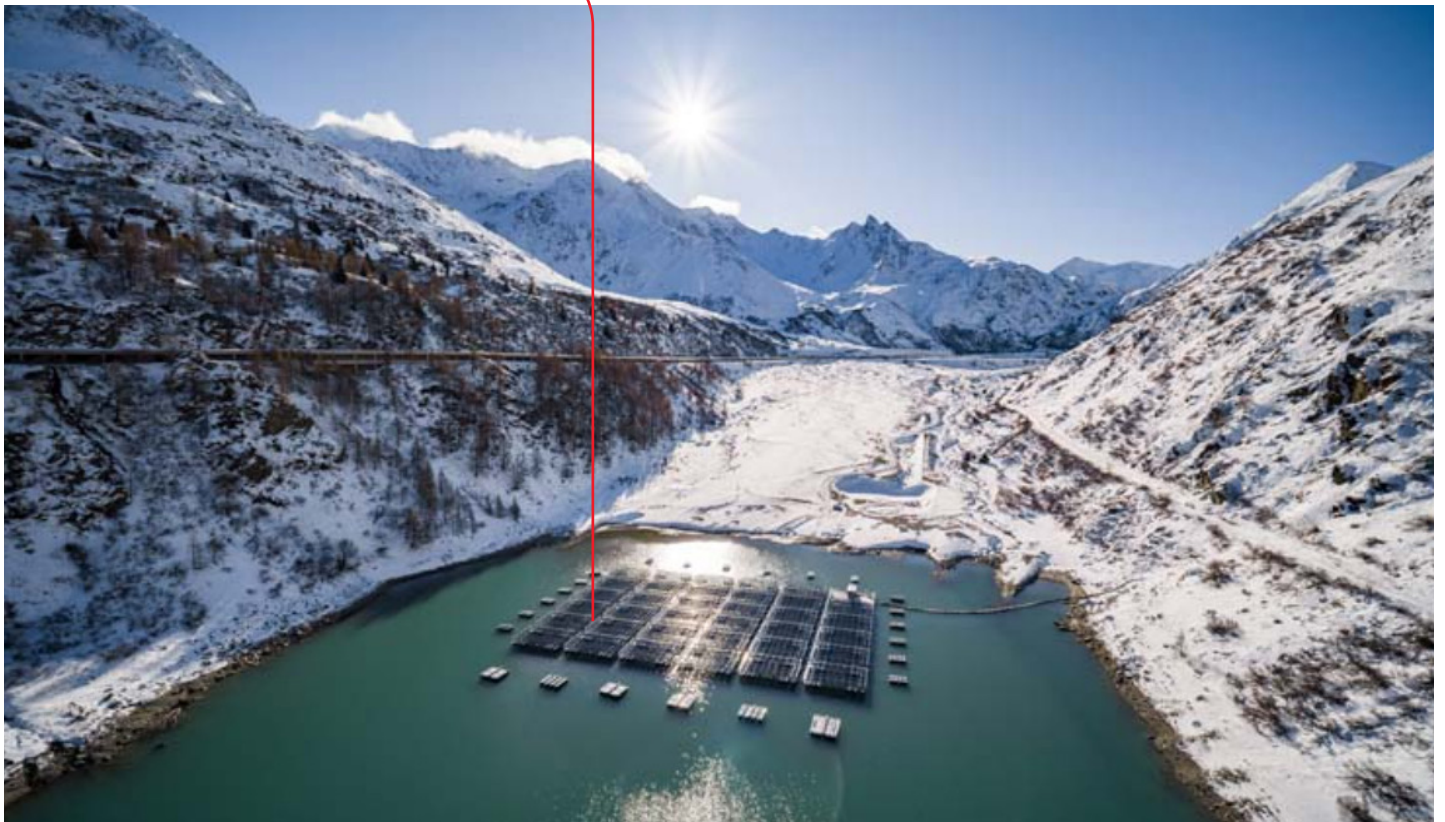
**220**  
households

**Romande Energie is constructing a floating solar power plant in the Alps using ABB's medium and low voltage equipment ideally suited to the harsh conditions found in high mountainous regions.**

The Lac des Toules near Bourg-St-Pierre (Canton Valais) in Switzerland is an artificial lake located at an altitude of 1800 meters. It has a surface area of 610 000 m<sup>2</sup> and supplies the de Pallazuit hydro power plant.

As the largest electricity company in western Switzerland, Romande Energie offers numerous environmentally-friendly solutions for a wide range of applications, from energy production and supply, and energy-sector services, to solutions relating to energy efficiency and e-mobility.

The solar power plant's pilot installation floats on the Lac des Toules at 1800 m above sea level. Its altitude, the climatic conditions and the expected





The total surface area of the panels is

**2240 m<sup>2</sup>**

producing 800 000 kWh of electricity annually

above-average annual energy yield – even during the winter months. Up to 50 cm of snow and ice up to 60 cm thick on the lake, plus variations in annual temperatures from -25°C to +30°C and wind speeds of up to 120 km/h demand products of the highest quality and excellent durability.

Because the air is thinner at this altitude, the sun's radiation is more intense than at lower levels. Yield and efficiency are also improved by using double-sided modules and the Albeto effect, by which the photovoltaic system absorbs the light reflected from the water, the sun and snow. The installation is able to continue generating electricity even when covered by snow. The efficiency gain compared to a solar installation of similar size in low-lying country is up to 50 percent. The pilot installation generates approximately 800,000 kWh of electricity annually, corresponding to the requirements of approximately 220 households. The advantages of establishing floating solar installations on reservoirs. They are artificial bodies of water, specifically created for generating energy.

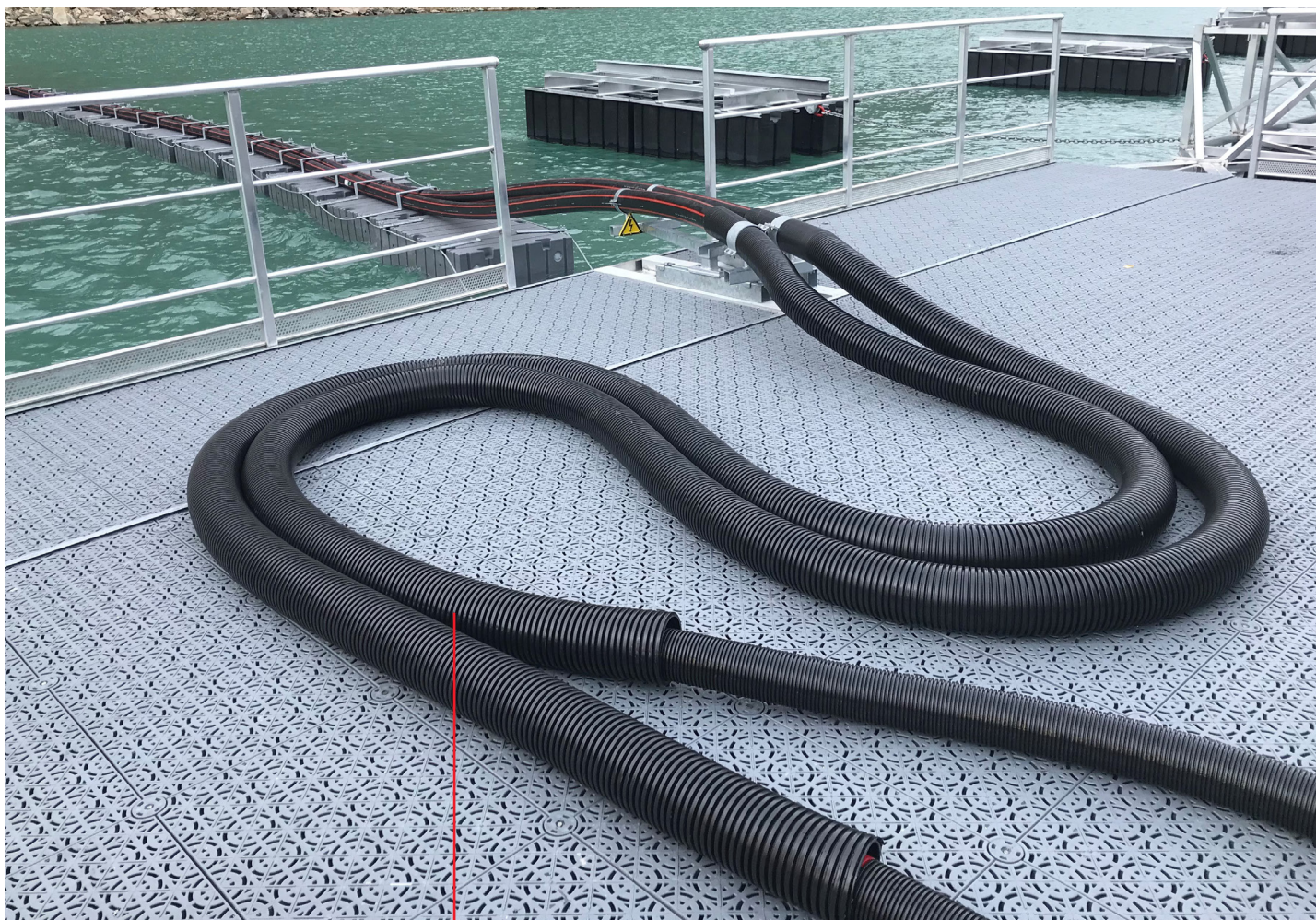
Therefore, they can be used twice over for the sustainable production of electricity. And since reservoirs such as the Lac des Toules are regularly drained, there is hardly any time for fauna and flora to develop in the water. Consequently, covering the lake with photovoltaic modules has very little impact on the ecological system.

## Up to 50% efficiency gain thanks to reflected light from snow and water

The power plant, which covers an area of 2240 m<sup>2</sup>, is made up of double-sided solar modules on 35 rafts which are attached by weights to the bottom of the lake. This allows them to rise and fall with the water level. Because the site is exposed, the floating PV structure and the technical equipment on it must be able to withstand wind speeds of up to 120 km/h, ice up to 60 cm thick and snow up to 50 cm deep.

Guillaume Fuchs, Romande Energie's project manager says: "We've been working on this project since 2012. So cooperating closely with our partners was of critical importance. ABB's ability to assist us by providing a complete technology package – including a transformer station with dry-type transformers, switchgear for medium and low voltage, cable protection and inverters as well as advice – was the decisive factor when it came to constructing this unique installation."





PMA®'s  
**PIHG**  
 conduit for the most severe  
 environmental requirements

Solar power plants are designed for a service life of between 25 and 40 years. It is vital that the sensitive direct current power cables which transfer the energy absorbed by the panels to the solar inverters are protected with the utmost efficacy. High UV irradiation levels, frost, snow, water and the free-moving, floating design of this project place a huge premium on cable protection.

ABB's PMA cable protection products offer the perfect solution for protecting the sensitive cables. The PIHG conduit used on this project to protect the cables is made of specially modified polyamide 12; it offers excellent fatigue strength under reversed bending stresses, good mechanical strength at low temperatures and in dry conditions – and, what's more, it offers PMA's greatest possible UV and weather resistance.

Of the more than 160 different conduits in PMA's portfolio, next to the PIHG conduit, the two types which are mainly used for applications of this nature

are the PIS/PIH conduit made of specially modified polyamide 12 for more severe dynamic situations, or the XSOL multilayer conduit made of specially modified polyamide 12 and polyamide 6 for mainly static applications. For attaching the conduits, PMA offers corrosion-resistant plastic-threaded connectors in various shapes and with up to IP69 waterproof rating.

**“PMA® conduits provide the greatest UV protection for cables in photovoltaic applications.”**

To quote Eric Salquin, Sales Engineer at ABB PMA: “Thanks to our top-quality products and our excellent technical advice and support, we are able to deliver successful solutions even for solar projects with particularly demanding requirements like this one.”

**Further expansion is planned**

If this pilot installation produces the expected efficiency gains compared to installations in low-lying areas, Romande Energie is planning to start expanding the Lac des Toules project in the future. The plan is to construct a PV system on the lake that will be several times larger than the pilot to supply electricity, equivalent to some 6100 households.





With its PMA cable protection product range, ABB offers an extensive portfolio of conduits, fittings and accessories for a wide variety of markets and applications.

#### ABB and Romande Energie

Romande Energie is constructing a floating solar power plant in the Alps using medium and low voltage ABB equipment ideally suited to the harsh conditions found in high mountainous regions. The Swiss Federal Office for Energy has awarded the “Watt d’Or 2021” in the Renewable Energy Class to Romande Energie and ABB Switzerland for their floating solar power plant on the Lac des Toules in the high Alps. Since 2007, the Watt d’Or has been a coveted seal of quality for energy excellence. Its purpose is to publicly acknowledge extraordinary achievements in the energy field.

#### Contact details

**ABB AG**  
**PMA Cable Protection**  
 Aathalstrasse 90  
 8610 Uster, Switzerland  
 Tel: +41 / 58 585 00 11  
[pma-info@ch.abb.com](mailto:pma-info@ch.abb.com)  
[www.pma.ch](http://www.pma.ch)

**Romande Energie**  
 Rue de Lausanne  
 1110 Morges  
 Tel: +41 0848 802 900  
[info@romande-energie.ch](mailto:info@romande-energie.ch)  
<https://www.romande-energie.ch>

ABB Switzerland AG  
 PMA Cable protection  
 Aathalstrasse 90  
 CH-8610 Uster  
 Switzerland

[www.pma.ch](http://www.pma.ch)

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