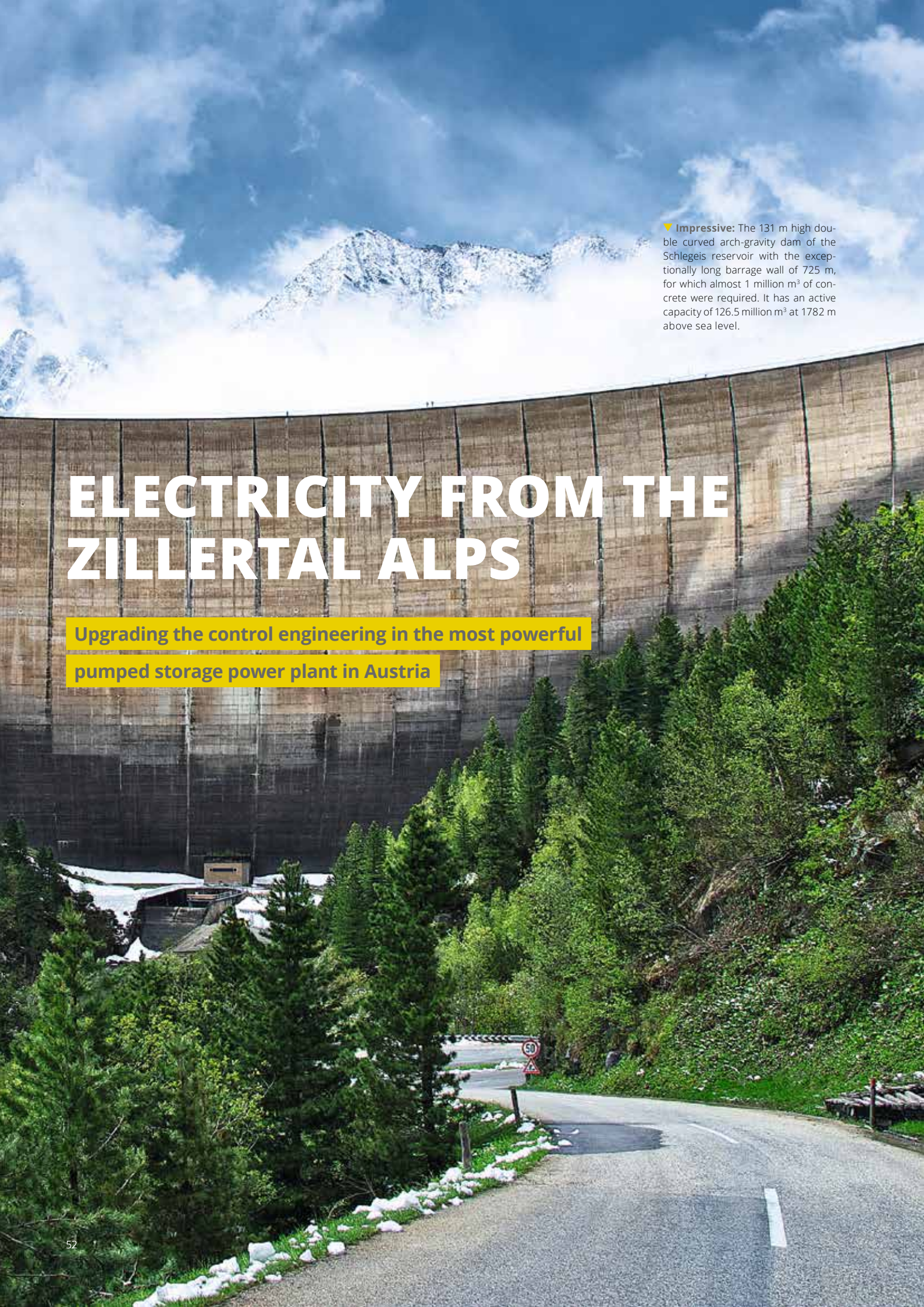

▼ **Impressive:** The 131 m high double curved arch-gravity dam of the Schlegeis reservoir with the exceptionally long barrage wall of 725 m, for which almost 1 million m^3 of concrete were required. It has an active capacity of 126.5 million m^3 at 1782 m above sea level.

ELECTRICITY FROM THE ZILLERTAL ALPS

Upgrading the control engineering in the most powerful pumped storage power plant in Austria

The main ridge of the Zillertal Alps in Austria at well over 2,000 meters above sea level is the source of several large streams that merge at 600 meters above sea level in the area near Mayrhofen in Austria. This water supply is used by the hydroelectric power plants of the Zillertal group. The upgrading of the entire control system in several stages between 2010 and 2014 has been the responsibility of Rittmeyer AG, a company based in Baar, Switzerland. For a long time, the company has relied on the M1 automation system from Bachmann electronic.

The Roßhag and Mayrhofen power stations were built between 1965 and 1971, and were extended in 1976. The Häusling power plant was built between 1974 and 1987. Together they form the most powerful group of storage power plants in Austria with a total output of almost one gigawatt.

Complete upgrade after thirty years

An upgrade of the entire control system was required in order to ensure the continued safe operation of these power plants. Rittmeyer AG was awarded the contract for this extensive modernization project, which was planned in several expansion stages over five years. This involved the replacing of the process control system for all twelve main machine units: Six double Pelton turbines in the Mayrhofen power plant, four Francis turbines with radial pumps in the Roßhag power plant and two in Häusling. The machine unit control system with a startup and shutdown sequence, control of auxiliary units, as well as mechanical and thermal protection was entirely based on the M1 automation system. The process stations for the general systems, such as cooling water, onsite consumption and switchboards, as well as the auxiliary and secondary systems, were also renewed.

Extensive end-to-end networking

»Over 50 networked M1 controllers and more than 30 remote substations connected via fiber optic cable were used,« Stephan Fabel, head of the hydropower division at Rittmeyer AG, describes the enormous magnitude of the installation in a single sentence. The process stations and the local operator panels are connected via a process bus in a ring topology. Inside the power plants this is implemented as a fiber optic Ethernet network with an IEC 60870-5-104 communication protocol.

Secure transmissions over large distances

»The integration of the high-speed FASTBUS in the M1 automation system is a major benefit for this solution as well as for most of our complete solutions,« Stephan Fabel highlights one detail. »This makes it easy to integrate remote input/output units in the control system over long distances via multimode fiber optic cables and without any loss in performance.«

This kind of requirement was needed, for example, at the Häusling power plant: It was built into the steep rock face with a maximum height of almost 64 m. The installation in the power house consists of two machine units, each made up of a generator, a Francis turbine as well a two-stage single-flow pump and a hydraulic converter – interconnected by means of a vertical shaft over a total height of 40 m. »Thanks to the FASTBUS, we were able to implement a completely reliable connection over these distances,« as Stephan Fabel confirmed. The control and monitoring of the 220 kV outdoor switching station at the Mayrhofen power plant are also integrated in the control system.

rittmeyer
BRUGG

Rittmeyer AG was founded in 1904 and is a company belonging to the Brugg Group. Headquartered in Baar, Switzerland, Rittmeyer develops and supplies turnkey measuring and control solutions for hydroelectric power plants, water and energy supply systems and waste water treatment plants. With around 300 employees, the company achieved a turnover of 67 million CHF (approx. 56 million euros) in 2012.

www.rittmeyer.com

» We really value the extraordinary robustness and quality of the M1 system. «

Stephan Fabel,
Vice president for hydropower
at Rittmeyer