Highly flexi

Scheme of Limberg 3, owned and operated by VERBUND

"Limberg 3 is designed very specifically to meet the future needs of the energy transition, making it Austria's most modern pumped storage power station."

Limberg 3, Austria – Following the successful engineering contract of the Limberg 3 pumped storage power station owned by VERBUND in Austria, ANDRITZ received a contract extension for the complete supply, erection, and commissioning of two variable-speed, asynchronous motor-generators for the plant. The contract, awarded in spring 2022, also includes three-phase excitation equipment.

Limberg 3 is an extension of the Glockner-Kaprun power plant group in the heart of the Austrian Alps. Like the previous Limberg 2, this new Limberg 3 plant will be built completely underground between the two existing storage lakes – Mooserboden and Wasserfallboden – as a further cavern-based storage power plant.
In order to achieve additional storage capacity and flexibility, the dam of the existing Wasserfallboden reservoir will be raised by a further 8 m.

With a total capacity of 480 MW in both turbine and pumping mode, Limberg 3 is designed as a modern, flexible, and high-capacity pumped storage power

ble pumped storage capacity

TECHNICAL DETAILS

Total output: 480 MW
Scope output: 2 × 280 MVA
Speed range: 450 rpm – 550 rpm
Head: 360 m
Voltage: 15 kV

station. It is specifically designed to meet the needs of the current energy transition and associated grid stability requirements. ANDRITZ is supplying the heart of this high-performance complex plant with the manufacture and installation of two double-fed induction motor generators (DFIM), including the AC excitation system.

DFIM TECHNOLOGY SPECIAL FEATURES

In contrast to the synchronous machine, in which excitation takes place with direct current, in DFIM systems the rotor is supplied with a low-frequency, three-phase alternating current by means of a frequency converter. Control of this frequency enables the use of a variable rotor speed in the range from 450 to 550 rpm. In addition to controlling the reactive power, this capability can also be used to regulate the active power in both pump and turbine mode. DFIM achieves higher overall plant efficiencies and safe operation of the turbine and allows adjustment to power consumption under different operating conditions.

The design of the rotor in a DFIM differs significantly from that of a synchronous motor-generator and is the key challenge for this type of machine. The 3D view of the Limberg 3 rotor, seen below, shows the rib shaft with the laminated rotor core, in which a three-phase high voltage winding is inserted. High-strength rings are shrunk onto both rotor ends as a retaining and supporting system for the rotor winding head. This compact and efficient approach to the rotor winding head is a patented ANDRITZ design which has already been successfully implemented in the reference plants Goldisthal in Germany and Fengning II in China.

The two variable-speed, asynchronous motor-generators make Limberg 3 extremely flexible.

3D view of the Limberg 3 rotor

Due to the increasing use of new energy sources like wind and photovoltaics, flexibility in terms of balancing and stabilizing the grid is of great interest to energy supply companies such as our customer VERBUND. Limberg 3 is thus another state-of-the-art pumped storage power plant in Austria that is ideally suited to the especially demanding requirements of the energy transition.

ANDRITZ is proud to support the customer VERBUND in realizing this important pumped storage project in the heart of the Austrian alps. On-site assembly works of both machines will be carried out in 2024 followed by commissioning test and completion of both units in mid of 2025.

AUTHORS

Johann Pössinger
Stephan Scheidl
Werner Ladstätter
hydronews@andritz.com