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Design challenges for the Francis units at Pubugou, China

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Abstract

The 3,300 MW Pubugou hydropower station, on the Dadu river in the west part of Sichuan Province, is the fifth largest hydropower station in China and the biggest on-going project in Sichuan province. Design challenges relating to three of the units, supplied by ANDRITZ HYDRO, are described here.

HPP Pubugou is an underground hydropower station (294.1 x 30.7 m wide), containing six generating units. Each unit is connected to individual 550 m long penstocks (diameter 9.5 m). Draft tubes exits of three adjacent units are connected to each of two tailraces. The six Francis turbines are designed to allow flexible operation and handle base, intermediate and peak load of the demanding Chinese power grid.

The contract for design, model testing, supply and installation supervision for three of the turbines was originally awarded in 2004 to GE Hydro. When ANDRITZ acquired in 2008 all of the GE Hydro's assets, intellectual property and expertise the contract was transferred to ANDRITZ HYDRO. The project is managed from ANDRITZ Technology China, located in Hangzhou, the design is supplied ANDRITZ HYDRO Canada located in Montreal.

The last of the three ANDRITZ HYDRO units was successfully commissioned in December 2010 by the owner, Dadu River Hydropower Development Co Ltd. A precise performance assessment of the hydro turbines will be carried out in the coming months.