

# Project Report

## Venda Nova II

The Venda Nova II pumped-storage station is located approximately 40 km north-east of Braga, in the northern region of Portugal. Venda Nova II is constructed in a granite rock mass on the left bank of the Rabagão river, between the Venda Nova and Salomonde reservoirs and is an important addition to the eight plant Cávado-Rabagão-Homem cascade system in northwest Portugal.

Rated at 191.6 MW, the Venda Nova II pumped-storage plant improves efficiency of the existing hydropower cascade system. Venda Nova II is owned by EDP Produção EM, Engenharia e Manutenção, S. A. The plant is equipped with two Francis pump-turbines and motorgenerators and has an annual production of 220 GWh.

The powerhouse is located in the middle of the hydraulic circuit at a depth of 350 m. It consists of two caverns connected by two galleries. A 1.5 km-long tunnel provides the main access to the powerhouse and transformer caverns. Both caverns are also connected to the surface by a ventilation and safety gallery.



Type of pump-turbines Francis reversible

Number of units	2
Maximum output	191.6 MW
Synchronous speed	600 rpm
Average net head	410 m
Discharge at average net head	50 m³/s
Maximum output at 422 m	194.2 MW
Maximum discharge at 422 m	51 m³/s
Maximum input for 420 m	189.4 MW
Maximum discharge for 420 m	42.6 m³/s

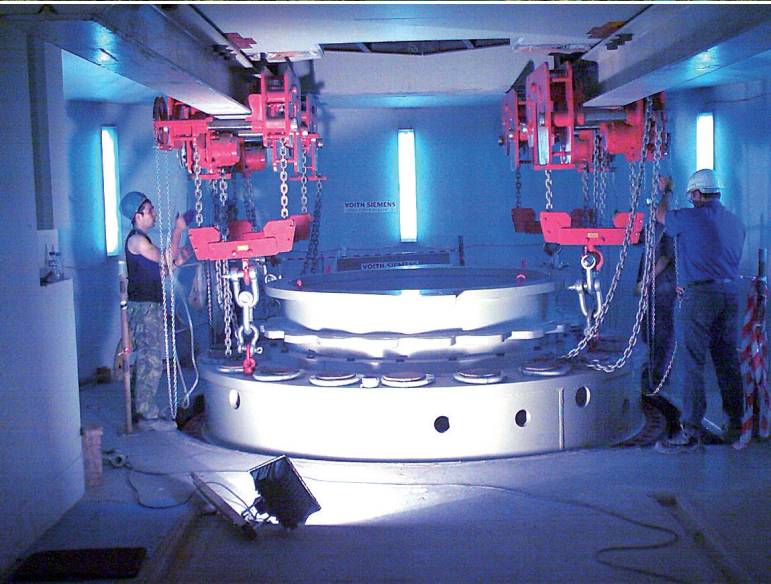


The lower intake is located on the arm of the Salamonde reservoir. Two concrete pillars create 3 openings. The upper intake, located on the left bank of the Venda Nova reservoir, consists of an inlet and is connected through a tunnel to the shaft where the operation and safety elements are located.

The 200 m-long penstock is equipped with a 1600 mm spherical valve on the upstream side, and a draft tube gate on the downstream side. A 150 kV switchgear yard is located in a separate building next to the entrance of the powerhouse access tunnel. Power from Venda Nova II is fed into the 150 kV National Electricity Network.

Voith Hydro's scope of supply

- 2 reversible pump-turbines and motor-generators
- spherical valves
- hydro-mechanical equipment



#### Type of motor-generators synchronous

Rated output	212.8 MVA
Rated input	189.4 MVA
Rated power factor	0.9
Rated voltage	12 kV
Spherical valve diameter	1600 mm
Start of operation	2004/2005

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