

CASE STUDY

Ad Hoc Solution for a Pumped Hydro Storage in Madeira

In order to give sustainability to the electric system and to maximize the use of renewable resources (hydro and wind) in the island of Madeira (Portugal), Empresa de Electricidade da Madeira, S.A. (EEM) is developing a project for the expansion of the hydroelectric capacity in Calheta. The contract for the expansion of the hydroelectric power station and the pumping station was awarded to the Consortium Energetus SA (Hydro Equipment) and Afavias SA (Civil Works). The project is currently under construction and will increase the production of electric power by 30 MW from 2017. The pumping station will have a total power consumption of 15 MW and will operate with variable frequency drive (VFD).



Upper reservoir, Barragem do Pico da Urze—1 000 000 m³ (photo courtesy of EEM)

The Sulzer difference

Sulzer acts as a partner, providing support and technical advice from the very beginning. We try to understand the needs of the customer overall and provide a solution adapted to the specific conditions of the project.

Our state-of-the-art pump portfolio comprises reliable and cost-effective solutions.

The challenge

The initial project plan involved installing the pumping station inside the hydroelectric power station. In that case, engineers would have needed to build a primary pumping station with separate booster pumps below the lower reservoir to provide the necessary suction head to the main pumps. The contractor looked for an alternative solution to reduce the size of the hydroelectric power station building and to simplify the layout.

The solution

Sulzer and the contractor developed an alternate solution after a thorough analysis of the Client's requirements during the tender phase.

The main pumps are installed in a pumping station separated from the hydroelectric power station and 20 m below the lower reservoir just right to provide the necessary suction head. Therefore, the primary pumping station (booster pumps) is not needed anymore.

The alternative solution was proposed in the tender and EEM awarded the contract to Energetus with that alternative solution.

Customer benefit

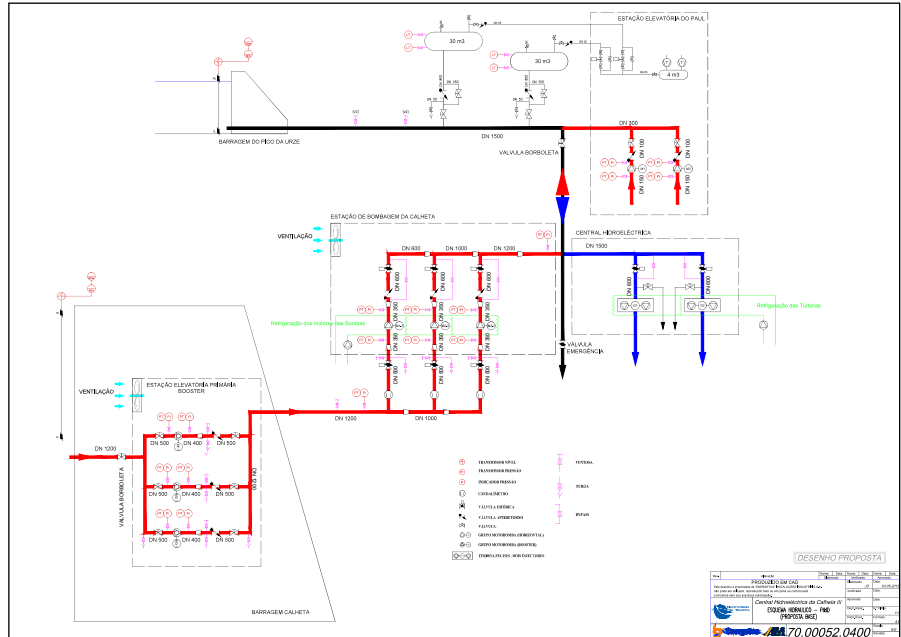
The cost-effectiveness of the alternative solution definitely helped Energetus to win the contract. At the same time, the solution simplifies the overall layout, reduces the number of machines (and related valves, piping, etc.), and increases the reliability of the pumping station.

Finally yet importantly, the construction of a smaller building for the hydroelectric power station reduces the environmental impact.

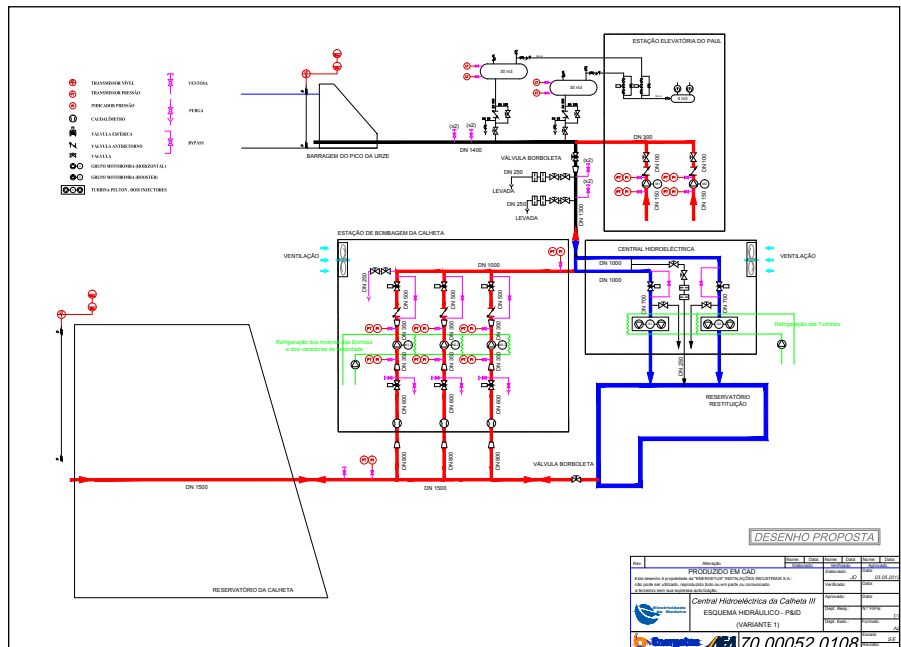
Pump data

Product type	MSD (3 units)
Flow	2,360 m ³ /h
Head	685 m
Motor power	5,500 kW

Piping and instrumentation diagram (P&ID) – initial solution



Piping and instrumentation diagram (P&ID) – alternative solution



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Applicable markets
Power generation, renewable,
pumped storage

Applicable products
MSD