MAROGGIA HPP

BERBENNO DI VALTELLINA (SO)-ITALY

2001-2002

2016-2019

ASSIGNMENT:

Refurbishment of the plant (final and detailed design, work supervision, test and commissioning):

- Replacement of 2 of 3 intake grids with new **Coanda-type grids**
- Replacement of the **turbine runner** and other interventions on fixed parts (nozzles, injectors) and on the generator
- Replacement of the **machine and penstock valves**
- Cleaning of the riverbed of Maroggia river

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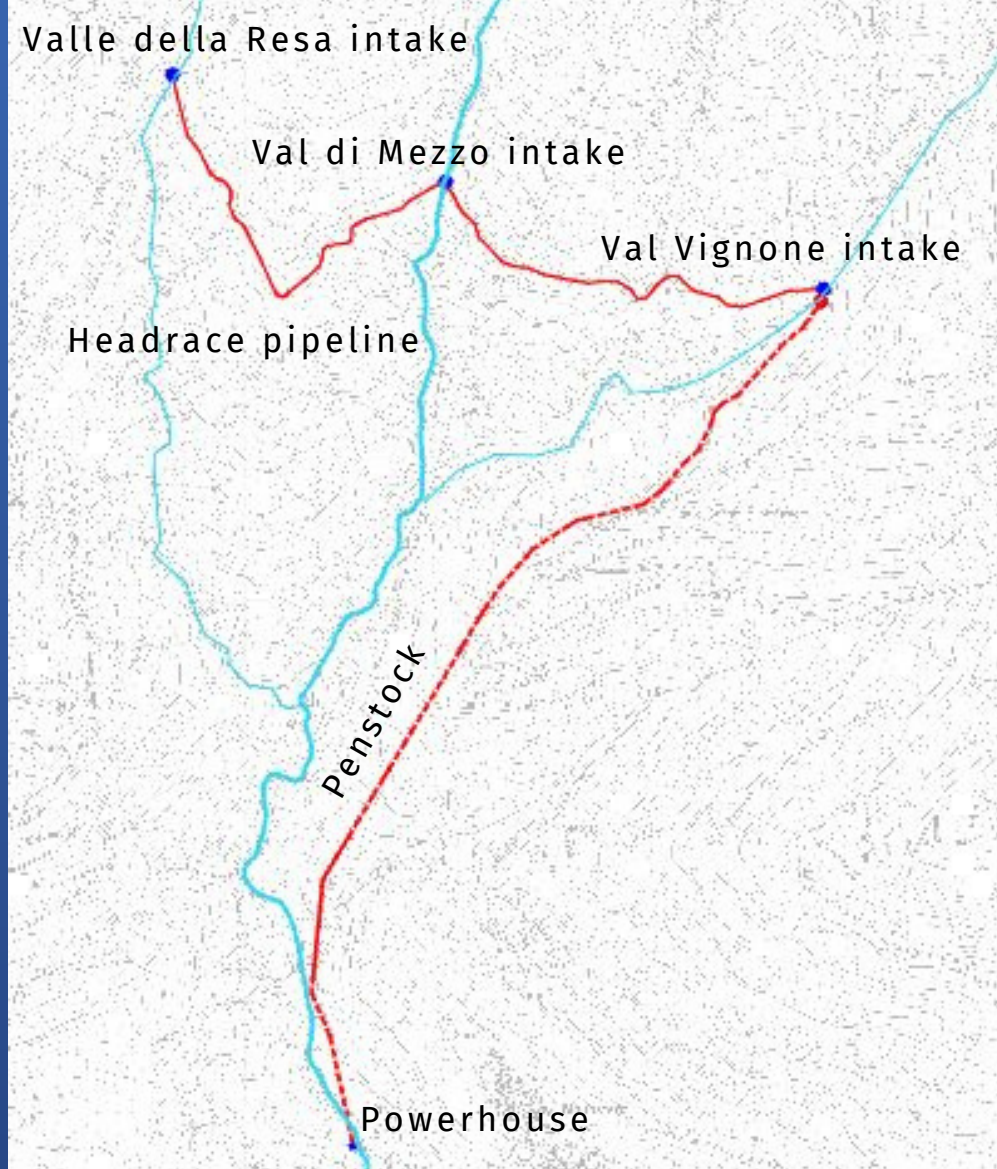
PLANT DESCRIPTION

Maroggia hydropower plant exploits water diverted by 3 intake works located in Val Laresa, Valle di Mezzo and Val Vignone in Sondrio province.

The derived flow rates are conveyed by a pipe which connects the three intakes to a forebay.
A steel penstock (~2.7 km length) starts from the forebay and brings water to the powerhouse where a two-jets Pelton turbine directly coupled to a synchronous generator transforms water into energy.

After passing through the turbine, the water returns to Maroggia river through a short tailrace canal.



MAIN CHARACTERISTICS OF THE PLANT

Gross head:	814,50 m
Max flow:	0,20 m3/s
Installed capacity:	1.400 kW

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INTERVENTIONS TO THE INTAKE WORKS OF VAL DI MEZZO AND VAL VIGNONE

The extraordinary maintenance interventions to the intake works consist in the **replacement of the original intake grids** (clogged by debris and sediment transported by floods) with a ***new Coanda-type grid***. Furthermore, the new Coanda grids are protected by additional steel protection grids.

To **separate debris from clean water**, the Coanda type screen uses the **"Coanda effect"**, a phenomenon exhibited by a fluid, whereby the flow tends to follow the surface of a solid object that is placed in its path.
In addition, the **triangular section wire is tilted on the support rods, producing offsets,** which cause a shearing action along the screen surface. The mesh wires are held horizontal.

The **water flows** to the collection system of the turbine through the screen slots, which are normally 1 mm wide. 90% of the suspended solid particles, whose velocity has been increased on the acceleration plate, pass over the screen thus providing excellent protection for the turbine.
Aquatic life is also prevented from entering the turbine through the slots.

In fact, the smooth surface of the stainless steel screen provides an **excellent passageway to a fish bypass.**

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INTERVENTIONS TO THE INTAKE WORKS

Val Vignone intake

Valle di Mezzo intake

OTHER INTERVENTIONS

On the occasion of the plant's shutdown for the realization of the rehabilitation works of the intakes, other interventions were carried out, among which:

- Replacement of the runner of the turbine and other interventions on fixed parts (nozzles, injectors) and on the generator
- Replacement of the machine valve
- Replacement of the penstock valve
- Cleaning of the riverbed of Maroggia river and removal of debris and material

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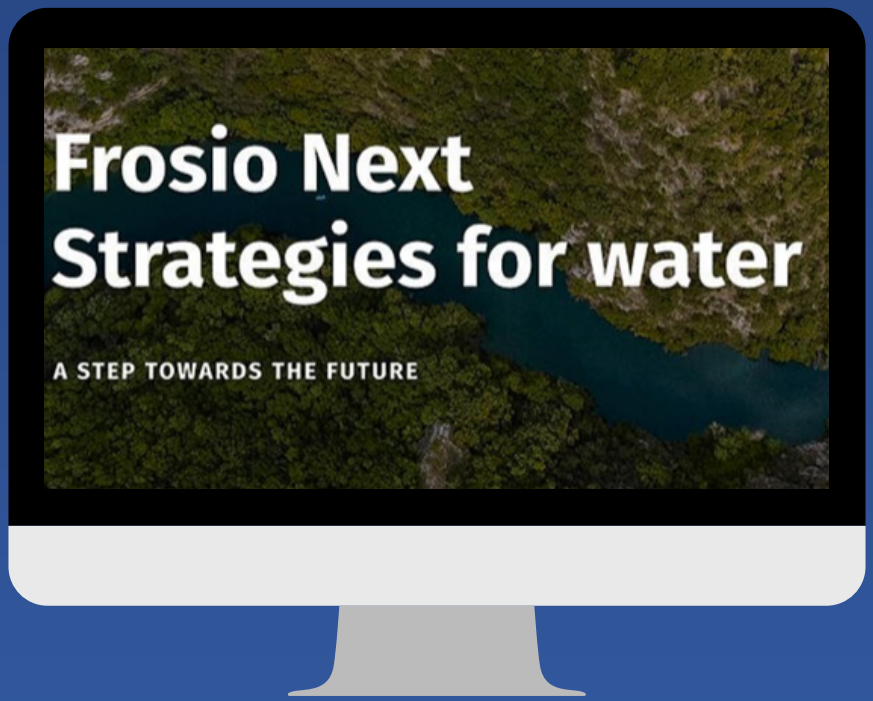

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