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Upgrade of "Pumped-Storage Power Plant Etzel" Feasibility Study

Client
Swiss Federal Railways (SBB)

Consultant
IUB Engineering Ltd in association with
IM Maggia Engineering Ltd

Construction period
2013–2014

Construction costs
CHF 250 million to CHF 1 billion
(depending on chosen upgrade option)

Scope of services
- Feasibility study with different upgrade concepts

Description
The existing SBB "Etzel Pumped-Storage Power Plant" has connected "Lake Sihl" with "Upper Lake Zurich" since 1937. The power plant is very important for power supply for the railway system in the Greater Zurich Area. The 80-year concession expires in 2017 whch is why the SBB needed to plan the reconstruction or expansion of the power plant. Feasibility studies for different options for upgrading and rebuilding the 16.7 Hz as well as the 50 Hz generation turbines with frequency converter were conducted:
- Complete newbuild of the scheme containing 3 new machine groups (approx. 525 MW)
- Combinations of new installation and continued operation/partial replacement of the existing plant with 4 machine groups (approx. 500 MW) or 3 machine groups (approx. 250 MW)
- Continued operation/partial replacement of the existing plant with 7 machine groups (approx. 140 MW) and 2 machine groups (approx. 150 MW)

The newbuild concept involves either a new underground or a shaft powerhouse. Additional measures such as "operation at overload" and "seperate energy dissipation" help to protect against flooding of the City of Einsiedeln, Sihl-Valley and the City of Zürich ("combined energy solution"). The options "continued operation" and "partial replacement" of the existing plant would mean modifications of 7 machine groups or new installation of 2 machine groups as well as a replacement of the underground penstock and a change of use of the existing powerhouse.