

Coordinated hydro power plant simulation for multi-reservoir systems

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Abstract— Hydro reservoirs usually serve two main purposes: hydro-power production and water consumption. The great flexibility, low operation costs and low carbon impact of hydro turbines turns them into a desirable technology in the generator mix of power systems. In addition, sustainability and environmental concerns support their use in current power systems, along with other renewable energy sources like wind and solar energy. However, the stochastic nature of river inflows hinders their long term use and advises the use of planning tools. Hence, it also requires the use of planning tools in order to balance present and future requirements. This work presents a simulation tool that is employed at Iberdrola to help in the preparation of medium term hydroelectric production schedules. The main objective of the simulation is to follow the production guidelines given by a long term hydrothermal problem, while avoiding spillages and failures to fulfill water release agreements. In order to achieve this, the simulation algorithm is structured around several phases that aim at coordinating the operation of all the elements in the basin. This way the simulation tool provides the operator a way to evaluate the outcome from forecasts of either water inflows or future operation situations. Some of the potential applications of this simulation tool are shown in this work: general simulation in order to know in advance consequences of possible inflows forecasts, and how to assess several maintenance schedules and different upgrade plans.

Index Terms—

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