

Flexibilization potential of the Limmat hydropower cascade through an optimized water level regulation of Lake Zurich

Hydropower is an important pillar of the Swiss electricity supply. In contrast to storage power plants, which can control their electricity production to a certain extent according to demand, run-of-river hydropower plants are dependent on the immediate availability of water. On the Limmat, this supply is primarily influenced by the water level control of Lake Zurich by the Letten weir at Platzspitz (Fig. 1). The current regulations have been in place since 1977 and aim to achieve an annual flow with natural fluctuations while at the same time meeting the different needs of various stakeholders in the best possible way.



Fig. 1: Confluence of the Limmat and Sihl rivers at Platzspitz (source: zh.ch)

The aim of this work is to assess the flexibility potential of the hydropower plant cascade on the Limmat river by developing and applying an optimized Lake Zurich water level regulation. While prior studies focused on increasing the overall production output, the objective of this thesis is to leverage the storage capacity of Lake Zurich to adjust production to inter-daily demand and electricity price fluctuations, by considering also different forecasting schemes of inflows. Cooperation with a hydropower operator is envisaged and the results should serve as a basis for discussions with decision-makers and authorities. The thesis should thus make an important contribution to the optimization of run-of-river power in Switzerland and thus to the federal government's Energy Strategy 2050.

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Remarks: Project-oriented thesis