Xuguang Yu, Gang Li, Yapeng Li, Chuntian Cheng, 2021, Robust short-term scheduling based on information-gap decision theory for cascade reservoirs considering bilateral contract fulfillment and day-ahead market bidding in source systems, February 2021, *Environmental Research Letters,* https://iopscience.iop.org/article/10.1088/1748-9326/abe6c3.

Abstract China is implementing a new power system reform, with one goal of renewable energy absorption such as hydropower. However, the forthcoming spot market challenges cascade hydropower generation in terms of the short-term hydro scheduling (STHS) problem. Specifically, STHS involves fulfilling bilateral market obligations and bidding for the day-ahead market with uncertainty. Coordination of these two tasks while managing market risks becomes a problem that must be urgently solved. Herein, we propose a method based on the information-gap decision theory (IGDT) to solve the cascade hydropower STHS problem, wherein the aforementioned tasks are coordinated simultaneously. The IGDT method was used to deal with the uncertainty of the day-ahead market price, and the robustness function was derived. A mixed-integer nonlinear programming model was used to describe the proposed problem, and a commercial solver was used to solve it. A four-reservoir cascade hydropower company was used as the research object. Through the robust dispatching results, the preset profit objectives of the power generation company were satisfied within the price information gap, and the day-ahead market bidding strategy and daily contract decomposition curve were obtained. The proposed model is found to be superior to the scenario-based probability method. Moreover, a comparative analysis of bilateral contract fulfillment showed that more profits can be obtained by coordinating contract fulfillment in the day-ahead market.

Keywords short-term hydro scheduling, cascade hydropower stations, information-gap decision theory, bilateral contracts, day-ahead market, power market.