IWRM2018-25
8th International Water Resources Management Conference of ICWRS

Sharing Compensation Benefits of Cascade Hydropower Stations Based on Shapely and Critic Value Method

Jiqing Li (1) and Xiong Yang (2)

(1) School of Renewable Energy, North China Electric Power University, Beijing,China (jqli6688@163.com), (2) School of Renewable Energy, North China Electric Power University, Beijing,China (m18611705156@163.com)

Abstract: In order to make compensation benefits distribution of cascade hydropower stations more reasonable and mobilize the stations' enthusiasm participating in joint operation, that is, to make the benefits maximum and take the fairness into consideration, the combination of the Critic Weight Analysis Method and Shapley Value Method is proposed in this paper. The Critic-Shapley model is established by comparing with the Single-Index Method, the Difference Method and the Shapley Method, which is applied to compensation benefits sharing of six hydropower stations in a basin cascade, as a reference for operating the joint. The results show that this method not only takes the fairness of benefits sharing into consideration, but also focuses on the differences between the stations, such as installed capacity, guaranteed output power, the annual average generating capacity and effective storage capacity. The distribution results are relatively fair and reasonable; especially the enthusiasm of leading power plant and downstream power plants at all levels participating in joint operation is mobilized, which is in favor of achieving the joint operation and maximum benefits of basin cascade.

Keywords: compensation benefits distribution; cascade hydropower stations; Shapely Value Method; Critic Weight Method; joint operation