

Water value in electricity markets

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Abstract-

This paper analyzes the operation of water resources of hydro-electric plants in competitive generation power markets. With that purpose, the traditional definition of water value used in centralized systems is updated and extended in order to adapt it to electricity markets, where generation companies face the hydrothermal coordination under a competitive environment. Two different water values are defined, as well as their applications: profit-based value and cost-based value. The paper proves that for the short-term operation of hydro units, the correct long-term signal is the cost-based water value, even in oligopoly markets. The proposed methodology to compute both water values is presented by means of an illustrative example, which is used to derive the mathematical formulation. Finally, the model is applied to a study case, where the obtained results show clearly the practical implications of the concepts discussed previously.

Index Terms- electricity markets; hydrothermal coordination; market equilibrium; water value

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