Electricity market short-term risk management via risk-adjusted probability measures

J. Barquín Gil; J. García González; N. Jovanovic; S. Cerisola López de Haro

Abstract-

This paper presents an iterative algorithm for modelling the mean-risk model with the Conditional Value at Risk (CVaR). The algorithm is based on the Lagrangian relaxation decomposition, and its main advantage is that it allows removing the coupling between the scenarios due to the constraints used to model the risk. At each stage of the algorithm, a risk-neutral stochastic optimisation problem is solved with the risk-adjusted probabilities that substitute the original ones. The paper presents the application of the proposed Iterative CVaR algorithm to two different short-term problems where the decision makers are exposed to a high volatility of electricity spot market prices. In the first problem a time horizon of one week is taken into account and a future physical contract is employed as a hedging mechanism. The second problem includes a very detailed formulation of the unit commitment problem. The numerical application is based on realistic data of the Iberian electricity market, where the algorithm has shown a good performance in terms of accuracy and computational time. In addition, this paper provides a criterion for selecting the value of the parameters used to implement the CVaR model.

Index Terms- iterative methods, power generation dispatch, power generation scheduling, power markets, probability, relaxation theory, risk management, stochastic programming

Due to copyright restriction we cannot distribute this content on the web. However, clicking on the next link, authors will be able to distribute to you the full version of the paper:

Request full paper to the authors

If you institution has a electronic subscription to IET Generation Transmission & Distribution, you can download the paper from the journal website: <u>Access to the Journal website</u>

Citation:

Barquín, J.; Cerisola, S.; García-González, J.; Jovanovic, N. "Electricity market short-term risk management via risk-adjusted probability measures", IET Generation Transmission & Distribution, vol.11, no.10, pp.2599-2607, July, 2017.