

Stochastic market equilibrium model for generation planning

J. Barquín, E. Centeno, J. Reneses

Abstract— It is widely accepted that medium-term generation planning can be advantageously modeled through market equilibrium representation. There exist several methods to define and solve this kind of equilibrium in a deterministic way. Medium-term planning is strongly affected by uncertainty in market and system conditions; thus, extensions of these models are commonly required. The main variables that should be considered as subject to uncertainty include hydro conditions, demand, generating units' failures, and fuel prices. This paper presents a model to represent a medium-term operation of the electrical market that introduces this uncertainty in the formulation in a natural and practical way. Utilities are explicitly considered to be maximizing their expected profits, and biddings are represented by means of a conjectural variation. Market equilibrium conditions are introduced by means of the optimality conditions of a problem, which has a structure that strongly resembles classical optimization of hydrothermal coordination. A tree-based representation to include stochastic variables and a model based on it are introduced. This approach to market representation provides three main advantages: Robust decisions are obtained; technical constraints are included in the problem in a natural way, additionally obtaining dual information; and large-size problems representing real systems in detail can be addressed.

Index Terms— No disponible/Not available

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 Probability in the Engineering and Informational Sciences, you can download the paper from the journal website:

[Access to the Journal website](#)

Citation:

Barquín, J.; Centeno, E.; Reneses, J.; "Stochastic market equilibrium model for generation planning", Probability in the Engineering and Informational Sciences, vol.19, no.4, pp.533-546. October, 2005.