Modeling risk management in oligopolistic electricity markets: a benders decomposition approach

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Abstract-

This paper presents a model for addressing the market risk management problem faced by a hydrothermal generation company trading in an oligopolistic market. The risk is due to uncertainty in fuel prices, power demand, water inflows, and electricity prices. The model permits the representation of a diversified generation portfolio and measures risk exposure by means of conditional value at risk. The model is formulated and solved as a stochastic linear complementarity problem. In order to deal with realistically sized problems, Bender’s decomposition technique is adapted to solve equilibrium models. A numerical example illustrates the possibilities of the algorithm we propose.

Index Terms- Complementarity problem, market equilibrium, risk hedging, stochastic programming

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