

Offering strategies and simulation of multi items dynamic auctions of energy contracts

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Abstract— The objective of this work is threefold. We firstly present an optimization model for a price-taker hydrothermal generation company (Genco) to devise bidding strategies in multi-item iterative auctions of long-term contracts. The bidding model calculates a bidder's best-response function, which takes into account the key issues on the auctioned contracts, such as its time horizon, the risk factors that affect the future contract outcomes, interdependence between auctioned products, and the agents' risk profile. The risk profile of the Gencos are represented as piecewise linear utility functions and a practical specification approach is proposed. We finally present a simulator of a uniform-pricing and iterative multi-item contract auction, where the set of auction rules is implemented and the optimization model developed is used to determine the Gencos's best responses at each auction round. The simulator enables auctioneers and generators to estimate the auction's competitive equilibrium price and to study the auction dynamics. A real multiproduct descending clock auction is simulated for the Brazilian power system under the proposed bidding scheme.

Index Terms— Electricity contract auctions, forward contracts, portfolio optimization, power system economics, utility function.

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