Bidding strategy under uncertainty for risk-averse generator companies in a long-term forward contract auction

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Abstract:
Since early 2000, long-term forward contracts or power purchase agreements (PPA) auctions have been the main mechanisms to ensure long-run supply adequacy in many growing economies, specially in Latin American, such as, Brazil, Chile, etc. With this framework, two issues are of special concern to Government agencies and market agents: (i) testing the design of the auction and its impacts on the power sector and (ii) the definition of bidding strategies by generators companies (Gencos) in these auctions to maximize their operation net revenue adjusted by the risk profile during the whole contract period. This work concentrates in (ii) and a strategic bidding model that takes into account the main uncertainties factors and the long-run Gencos' risk profile will be presented to assess the Willing-to-Supply curve. The agent risk profile is characterized by means of a piecewise linear utility function and an intuitive approach, based on the most relevant financial company's parameters, will be introduced to determine it. In addition, a probability dependent utility function representation for the CVaR coherent risk measure is provided in order to compare both risk attitudes. A case study with realistic data from the Brazilian Power System will be presented to illustrate the applicability of the model.

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