

Long-Term Hydrothermal Bid-Based Market Simulator

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Simulating long-term hydrothermal bid-based markets considering strategic agents is a challenging task. The representation of strategic agents considering intertemporal constraints within a stochastic framework brings additional complexity to the already difficult single-period bilevel, thus, non-convex, optimal bidding problem. Thus, we propose a simulation methodology that effectively addresses these challenges for large-scale hydrothermal power systems. We demonstrate the effectiveness of the framework through a case study with real data from the large-scale Brazilian power system. In the case studies, we show the effects of market concentration in power systems and how contracts can be used to mitigate them. In particular, we show how market power might affect the current setting in Brazil. The developed method can strongly benefit policymakers, market monitors, and market designers as simulations can be used to understand existing power systems and experiment with alternative designs.