

## Demand Side Participation in Electricity Markets

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### Abstract

In many wholesale electricity markets, the demand-side is merely treated as a forecasted load to be served under all conditions: Balancing generation and load is done almost entirely through actions taken from the supply side. Likewise, end consumers in retail markets are rarely offered time-varying prices that reflect the underlying costs of serving the system load. Without active demand-side participation in closing the gap between the retail and wholesale markets, generators have less incentive to sell their capacities at true cost. This could lead to market failures in forms of price spikes, which is ultimately endured by the end consumers. Generally, the move towards competitive electricity markets has changed how electricity is traded, and thereby opened the door for Demand Side participation (DSP). DSP offers consumers the opportunity to receive financial compensation for making short-term changes to their electricity consumption. By rescheduling loads or agreeing to load reductions, consumers help to maintain a balance between electricity supply and demand and to ensure the quality and security of supply. The result of this participating is an electricity network that operates more efficiently.

This aim of this presentation is to develop an optimal bidding strategy for load serving entity (LSE) participating to pool market. The objective of this LSE is to maximize his profit. The profit modeled as a stochastic optimization problem where genetic algorithm approached is applied to get the corresponding solution. On the other hand, the historical bidding data of the competitors' described by a normal probability distribution function. The proposed bidding strategy have been tested in small power system, where different scenarios and simulation have been presented. When the forecasted load for LSE in one unit time (e.g. 1 hour) is 600 MW, the cleared blocks based on market clearing process varies from 530 to 599 MW based on different risk weighting factors. On the other hand the, profit also fluctuates according to the risk between [4843.5 & 15944] as the quantity is increasing. Finally, the impact of different retail prices on profit while considering, fixed interrupted prices and risk values, also presented and illustrated.

**Key-words:** Electricity markets, Demand Side Participation, bidding Strategy, Load serving Entity.