Easy Money in FTR Auctions

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Electric Power

Electric Power is a peculiar commodity (lack of significant storage capability and need for substantial delivery infrastructure). Industry was highly regulated. In late eighties, a new system to regulate prices began to gain acceptance.

Nodal Pricing System

An institutional arrangement equipped to regulate prices in the wholesale electricity market to create an outcome mirroring that from a hypothetical competitive market equilibrium.

Congestion Means Power flow on the line at its rated capacity

LMP: Locational Marginal Price, representing the opportunity cost of meeting a given demand situation, has three components.

\[
LMP = \frac{\text{Marginal cost of Generation}}{\text{Marginal cost of Congestion}} - \frac{\text{Marginal cost of Losses}}{\text{Marginal cost of Congestion}}
\]

All marginal costs are computed from the dual variables within the linear optimization problem solved by an independent entity to allocate generation assets for meeting demand reliably.

Opportunity cost associated with transmitting 1 MW of power flow from a given source node (point of injection) to a given sink node (point of withdrawal) is called congestion rent.

Hogan (1992) suggested a hedging contract, came to be known as Financial Transmission Right (FTR) Obligation.

FTR Obligation – A Unusual Financial Claim

The payoff structure immediately suggests that the payoff to a portfolio of FTRs (same period and same number of MWs), such that they form a closed loop, should be zero.

\[
\text{Payoff} = \sum_{i} \left( \frac{\text{MCC}_{i} - \text{MCC}_{i}}{\text{MCC}_{i} - \text{MCC}_{i}} \right) = 0
\]

Individual contracts yield uncertain payoffs, but the portfolio always yields a deterministic payoff of zero.

Auctions for FTR Obligations

In most wholesale electricity markets, FTR Obligations are sold in auction. In some markets, a multi round auction format is used. Investors’ bids specify source sink and MW quantity. The winners and clearing prices are announce at the end of every round. The clearing prices inherit a structure. For any set of FTRs (of equal MWs) cleared in the same round that form a closed loop, the clearing prices sum to zero.

The pricing principle means, in any given round of the multi-round FTR auction, the portfolio of offsetting FTRs can only be acquired for $0.

\[
\text{Auction Clearing price of portfolio} (\text{FTRA}_{A} \rightarrow \text{B}, \text{FTRB}_{B} \rightarrow \text{C}, \text{FTRC}_{C} \rightarrow \text{A}) = 0
\]

In any given round of the FTR auction, clearing prices are hence consistent, i.e. a portfolio with deterministic zero payoff can only be acquired for $0.

There is no such guaranteed clearing in a multi-round format.

The following was observed in 2007 Annual FTR auction conducted by PJM Interconnection, the largest wholesale market in the country.

Conclusions

A shortageing of multi-round auction for FTR Obligations is described.

Examination of PJM auction data reveals that some investors are benefiting from transactions that result in risk-free profit.

A thorough analysis involving the strategic behavior of the auction participants will greatly improve our understanding of these markets and potentially improve their overall efficiency.