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## Research

### Executive summaries from *IIE Transactions* and *The Engineering Economist*

Edited by Susan Albin and Joseph Hartman

### Using forwards in electricity markets

The article previewed above allows for a power plant owner to shift some risk to another party by reducing the uncertainty in fuel, usually natural gas, prices. However, there are a variety of mechanisms in which an electric power generation company can reduce its exposure to risk. One mechanism is called a forward contract.

When a company generates power, the output generally does not exactly match demand that must be met through contracts. That is, any remaining output after serving local customers (contractual obligations) can be sold in off-system markets. These sales generally are defined as firm (having a contract) or economic (sold on the market via a broker when the market price exceeds the dispatch cost). If managed correctly, sales on the market can lead to large profits.

However, there is great uncertainty when selling on the market. Due to the fact that generated electricity cannot be stored and demand is uncertain, electricity spot prices are volatile. Thus, companies often use futures and forwards to hedge against this uncertainty. A financial forward contract assumes that cash payments are made at the time of maturity while a physical forward contract requires the delivery of electricity (amount and time). An example of a financial forward contract is as follows: A 50 megawatt of "5 by 16" (peak time) financial forward sold on April 2 for September means that 50 megawatts are sold at a fixed price for every "5 by 16" (peak) hour for the entire month of September. When September comes, the utility buys back the 50 megawatt financial forward at September spot prices. Using these contracts, the electricity supplier can hedge against shifts in market prices. Most electricity futures are traded on the New York Mercantile Exchange (NYMEX), while the majority of electricity forwards are traded in the over-the-counter (OTC) markets.

In "Improving Financial Performance with Hedging via Forwards for Electric Power Generation Companies," the authors devise a strategy to hedge against price movements using financial forwards. Specifically, they determine the optimal amount of additional on-peak financial forwards to sell in order to hedge against the risk exposure of off-peak spot prices.

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*IIE Transactions is IIE's flagship research journal and is published monthly. It aims to foster exchange among researchers and practitioners in the industrial engineering community by publishing papers that are grounded in science and mathematics and motivated by engineering applications.*

*The Engineering Economist is a quarterly refereed journal devoted to issues of capital investment. Topics include economic decision analysis, capital investment analysis, research and development decisions, cost estimating and accounting, and public policy analysis.*