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An option-based approach to power plant valuation

The electricity generation business in several parts of the United States is moving away from regulated monopolies toward market competition. Under market competition, because a company that generates power has no obligation to serve power, it has options to turn on or turn off its power plants based on market conditions.

For such cases, in "Electric Power Plant Valuation Based on Day-Ahead Spark Spreads," Chung-Hsiao Wang and K. Jo Min develop a new approach to value a power plant that is based on a financial option called "day-ahead spark spread" and the actual practice by the dispatchers and traders of a power generation company. Wang is a financial engineer and model analyst for Louisville Gas and Electric Co. and Kentucky Utilities Co. Min is an associate professor in the Department of Industrial and Manufacturing Systems Engineering at Iowa State University.



Wang and Min demonstrate this new approach for a simple cycle gas power plant that is prevalent in the industry. Specifically, their model incorporates the fact that the relevant economic and technical data are reviewed in the early morning for their daily decisions. Then, using realistic data primarily from publicly available sources, they show how the valuation of the power plant can be obtained via simulations of the electric power price, fuel price and forced outage.

The key difference from the extant literature on power plant valuation is that the authors incorporate how a utility actually operates on limited information for the future on a forward basis, as compared to computationally taxing backward dynamic programming-based decisions that are unlikely to be followed through by dispatchers in practice. The authors believe their approach of accurately incorporating how a business actually operates can be extended to numerous valuation problems in other businesses with complex operations.

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