

# THE DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING SPEAKER SERIES

**PRESENTS**

## **Market-based Resource Adequacy Assessment Framework: The Impact of Market Design on Long-run Resource Investment and Reliability**

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**Monday, April 13, 2021, 09:55 AM**

**ZOOM meeting room (Meeting ID: 940 2421 5678 | Passcode: 270682):**

<https://uofh.zoom.us/j/94024215678?pwd=UGFJMkMvUFBkWk5MNmlGbnZTbUJFZz09>

### **LECTURE ABSTRACT**

Increasing penetrations of low or zero marginal cost generation may lead to declining wholesale energy prices and a corresponding decline in revenues for generators and other resources in the system. As a result, resources may increasingly rely on revenues from providing other services, such as operating reserves or capacity to ensure revenue sufficiency. However, traditional generation expansion planning models that determine the least-cost resource mix do not capture strategic interactions between generation companies and markets. This presentation will introduce a market-based resource adequacy assessment framework that can analyze the system generation portfolio that results in a competitive market environment. The model provides improved analysis of generation expansion and revenue sufficiency in a competitive market environment by capturing the strategic capacity investment and retirement decision-making of profit-maximizing generation companies. The modeling framework is based on Stackelberg leader-follower games and is formulated as a bi-level optimization problem, which is then transformed into a mathematical program with equilibrium constraints. A case study of the ERCOT system will be discussed. Lastly, our recent enhancement of the modeling framework will be presented.

### **SPEAKER BIOSKETCH**

Jonghwan Kwon is currently an Energy Systems Engineer in the Center for Energy, Environmental and Economic Systems Analysis at Argonne National Laboratory. His research focuses primarily on modeling and analysis of power systems operations and planning using a variety of mathematical optimization and simulation methods. Recent studies have focused on 1) resource adequacy under a competitive market environment, 2) energy storage treatment in regional transmission planning, 3) evolving market participation models for energy storage, and 4) valuation of pumped storage hydropower. He received his Ph.D. degree from Arizona State University in 2017.

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