

Fall 2014 Seminar Series

Presented by the ECE Division

Effect of Smart Grid Technology on the Secure and Economic Operation of Power Systems

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In smart grid, as renewable energy becomes a significant portion of the generation mix, effective approaches are needed to manage volatility and uncertainty associated with renewable such as wind and solar. Also the proliferation of demand side is creating a need in improving energy efficiency by aggregating individual demand response into the bulk system load. As power systems get more integrated and the demand side gets more active, smart grid technologies will play an increasingly important role in the control and operation of the electric grid. This presentation will discuss some key issues in the operation of bulk power systems with smart grid technologies, in particular, renewable energy and demand response. Stochastic SCUC (Security-Constrained Unit Commitment) and robust SCUC models are discussed, which aim at optimizing the operation of the electricity infrastructure while maintaining a secure state of the system in an uncertain environment. Stochastic and robust SCUC models will have wide applications in analyzing the short-term power system security and executing midterm and long-term reliability studies. Stochastic and robust SCUC models are particularly useful for modeling the large-scale integration of renewable energy and demand response programs into the electric power grid, as the nation develops a low-carbon, sustainable, and reliable electricity infrastructure.

Dr. Lei Wu



Dr. Lei Wu is an Assistant Professor of Electrical Engineering and former senior research associate at the Robert W. Galvin Center for Electricity Innovation at Illinois Institute of Technology. He is the 2013 NSF CAREER recipient. He is the lead investigator for several projects sponsored by NSF, DOE, NYSERDA, and power industry, and currently serves as an editor for the IEEE Transactions on Sustainable Energy.

