A Framework for Transmission Planning Under Uncertainty

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Abstract: Transmission planning is typically faced with a wide range of uncertainty including growth in demand, renewable energy generation and fuel price. The restructuring of the electric power industry, the drive for energy independence and the push for a cleaner environment have led to additional sources of uncertainty in all aspects of power system operations and planning. The more decentralized decision-making implicates uncertainty in future generation investment and retirement of existing units. Such uncertainties are among the biggest challenges in transmission planning in power systems. However, existing approaches in the literature do not fully address this problem. In this presentation, I will discuss our studies of two optimization criteria for the transmission planning problem with a simplified representation of load and the forecasted generation investment additions within the robust optimization paradigm. Then I will talk about a new robust transmission planning model representing generation investment and retirement uncertainty more realistically to improve the quantification and visualization of uncertainty and the impacts of environmental policies.

Biography: Bokan Chen is a PhD candidate in the Department of Industrial and Manufacturing Systems Engineering at Iowa State University. He is currently interning as a research aide at Argonne National Lab, IL, where he is working on methods to improve power system resilience. His research focus is on methods of optimization under uncertainty, including robust optimization and stochastic programming, and their applications in power systems. Topics in power systems he has worked on include unit commitment, transmission expansion planning and the planning and operation of microgrids. He received his Bachelor’s degree in Electronics and Information Engineering at Huazhong University of Science and Technology, Wuhan, China in 2011 and his Master’s degree in Industrial Engineering at Iowa State University in 2013. His other experiences include a previous internship at Argonne National Lab in 2013 and an internship at Monsanto Company in 2015.