

Massively Digitized Power Grid: Enabling Deep Decarbonization through Domain-tailored Analytics

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Abstract: Driven by major trends such as decarbonization of generation and electrification of vehicles, the electric power sector across the globe is moving to a future where massive digitization and information flow is used to compensate for the resulting reduced operating reserves at multiple time scales.

In this talk, Xie will first present a scenario approach-based, risk-quantifiable market dispatch to incorporate massive renewables and demand response. At a finer time-scale, Xie will present a synchrophasor data-driven approach to detecting and localizing transient anomalies in high-renewable power systems with physics-based interpretation on the effectiveness of the algorithm. Both are demonstrated with real-world data and validation. This talk will conclude with some remarks on how to align the technological solutions with proper market/regulatory framework towards deep decarbonizing of the electricity sector.

Bio: Dr. Le Xie is a Professor, Chancellor EDGES Fellow, and Presidential Impact Fellow in the Department of Electrical and Computer Engineering at Texas A&M University, and the Assistant Director-Energy Digitization at Texas A&M Energy Institute. He received B.E. in Electrical Engineering from Tsinghua University in 2004, S.M. in Engineering Sciences from Harvard in 2005, and Ph.D. in Electrical and Computer Engineering from Carnegie Mellon in 2009. His industry experience includes ISO-New England and Edison Mission Energy Marketing and Trading. His research interest includes modeling and control in data-rich large-scale systems, grid integration of clean energy resources, and electricity markets.

Dr. Xie received the U.S. National Science Foundation *CAREER Award*, and DOE Oak Ridge Ralph E. Powe Junior Faculty Enhancement Award. He was awarded the 2017 IEEE PES Outstanding Young Engineer Award. He was recipient of Texas A&M Dean of Engineering Excellence Award, ECE Outstanding Professor Award, and TEES Select Young Fellow. He serves or have served on the Editorial Board of IEEE Transactions on Smart Grid, IET Transaction on Smart Grid, and Foundations and Trends in Electric Energy Systems. He is the founding chair of IEEE PES Subcommittee on Big Data & Analytics for Grid Operations. His team received the Best Paper awards at North American Power Symposium 2012, IEEE SmartGridComm 2013, HICSS 2019 and 2021, IEEE Sustainable Power & Energy Conference 2019, and IEEE PES General Meeting 2020.