THE WSU-PNNL ADVANCED GRID INSTITUTE

NETWORKED MICROGRIDS AS DECARBONIZATION AND RESILIENCY RESOURCES

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Tuesday, April 27 • 11:00 AM – Noon (PT) • Join on TEAMS [Link to TEAMS meeting]

OVERVIEW

Microgrids show great promise as a resilience resource to provide non-discontinuous service to critical end-use loads during extreme events. They are also essential in facilitating greater renewable energy penetration, optimizing resource mix, and decarbonizing the power grid. Some challenges include the uncertainty of renewable-interfaced DERs, the infrastructural needs of communication systems, control systems architecture, and regulatory barriers. This talk will provide an exploration of resilient microgrid applications in two parts. The first part will focus on PNNL efforts in assessing resilient microgrid operations and controls by elaborating on (a) the DOE microgrids program for examining the dynamic modeling and simulation of networked microgrids for resilient port operations, (b) Citadels project and the use of consensus algorithms for distributed operation of networked microgrids, and (c) the Duke Resilient Distribution System project and the coordinated operations of centralized and distributed control systems to integrate higher penetrations of DER. The second part looks at a communication-assisted microgrid application where the communication systems degradation in the form of loss or high latency can cause maloperation and reduce resiliency. The HELICS co-simulation framework to evaluate cyber-physical interdependencies of the microgrid and a delay-tolerant control algorithm using Dynamic Mode Decomposition will be demonstrated.

BIOS

Dr. Kevin Schneider received his BS in Physics and his MS and PhD degrees in Electrical Engineering from the University of Washington. His main areas of research are distribution system analysis and power system operations. He is currently a Chief Engineer at the PNNL and Manager of the Distribution and Demand Response Sub-Sector. Dr. Schneider is a Research Professor at Washington State University as part of the PNNL/WSU Advanced Grid Institute (AGI), an Affiliate Associate Professor at the University of Washington, and a licensed Professional Engineer in Washington State. He is a Fellow of the IEEE, past chair of the Power & Energy Society (PES) Distribution System Analysis Sub-Committee, and current Chair of the Analytic Methods for Power Systems (AMPS) Committee.

Gowtham Kandaperumal is currently a Ph.D. candidate with the School of Electrical Engineering and Computer Science at the Washington State University, Pullman, WA, and a WSU-PNNL Distinguished Graduate Research fellow at Pacific Northwest National Laboratory. His work includes quantification and enabling of distribution system resilience, resilient design, planning and operation of distribution grids, and co-simulation of cyber-physical systems. He received his Bachelor's degree in Electrical and Electronics Engineer from Anna University, India, in 2012 and his Master's degree in power engineering from Arizona State University in 2014. He worked as an electrical engineer with Affiliated Engineers, Inc., Madison, WI, working on distribution system design and analysis, building electrification, and planning during 2014 - 2017.