



# Microgrids and Energy Storage for Emergency Grid Resilience Webinar Series

## Session 4: Microgrid & Energy Storage Engineering Challenges

Friday, December 3, 2021

10:00 AM to 12:20 PM (CT)

Presented by:

**U.S. DOE Office of Electricity Energy Storage Program,  
Iowa State University Electric Power Research Center,  
and Sandia National Laboratories**

As extreme weather events and other potential disruptions to the electric grid increase in frequency, the need for new technologies and approaches for providing resilience in the grid increase as well. This five-session series will explore technologies, policies, economics, applications, and case studies associated with microgrids and battery energy storage as options to help emergency management agencies provide greater electricity resilience across the states in FEMA Regions 5 (IL, IN, MI, MN, OH, WI) & 7 (IA, KS, MO, NE).

### Agenda

#### December 3, 2021 - Microgrid & Energy Storage Engineering Challenges

10:00 - 10:10	<b>Introductory Remarks</b> Dr. Imre Gyuk, Director, DOE Office of Electricity Energy Storage (ES) Program
10:10 - 10:30	<b>Interoperability, Interconnection</b> Dr. Mike Ropp, Sandia National Laboratories
10:30 - 11:00	<b>Grid-forming Inverters for Scalable Microgrids</b> Dr. Brian Johnson, University of Washington
11:00 - 11:10	<b>Discussion/Q&amp;A</b>
11:10 - 11:30	<b>Case Study</b> Brent Pryor, Black & Veatch
11:30 - 11:50	<b>Alliant Microgrid Projects Constructed/Operated in Wisconsin</b> Michael Graves, Alliant Energy
11:50 - 12:10	<b>Optimization of Control at Scale</b> Dr. David Schoenwald, Sandia National Laboratories
12:10 - 12:20	<b>Discussion/Q&amp;A</b>



## Speaker Biographies



### **Dr. Imre Gyuk, Director, DOE Office of Electricity Energy Storage (ES) Program**

After taking a B.S. from Fordham University, Dr. Imre Gyuk did graduate work at Brown University on Superconductivity. Having received a Ph.D. in Theoretical Particle Physics from Purdue University he became a Research Associate at Syracuse. As an Assistant Professor he taught Physics, Civil Engineering, and Environmental Architecture at the University of Wisconsin. Dr. Gyuk became an Associate Professor in the Department of Physics at Kuwait University where he became interested in issues of sustainability. Dr. Gyuk joined the Department of Energy to manage the Thermal and Physical Storage program. For the past two decades he has directed the Electrical Energy Storage research program in the Office of Electricity, developing a wide portfolio of storage technologies for a broad spectrum of applications. He supervised the \$185M ARRA stimulus funding for Grid Scale Energy Storage Demonstrations and is now partnering with the States on numerous storage projects for grid resilience. His work has led to 12 R&D 100 awards, two EPA Green Chemistry Challenge Awards, and Lifetime Achievement Awards from ESA and NAATBatt. He is internationally recognized as a leader in the energy storage field.



### **Dr. Michael Ropp, Sandia National Laboratories**

Michael Ropp received the Bachelor's degree in Music from the University of Nebraska-Lincoln in 1991, and the Masters and Ph.D. in Electrical Engineering in 1996 and 1998, respectively, from the Georgia Institute of Technology, Atlanta, GA. He is presently a Principal Member of Technical Staff at Sandia National Laboratories, Albuquerque, NM.

Dr. Ropp has over twenty years of experience in research and education in power engineering, power electronics, and photovoltaics. He has authored over eighty technical publications and holds six patents. He is a Senior Member of the IEEE and is active in standards creation, and is a registered Professional Engineer in South Dakota and Hawaii. His primary technical interests are in power electronics, especially solid-state transformers; the planning, design, modeling and simulation, control, dynamics, protection, reliability, diagnosis and event analysis of low-inertia, distributed and inverter-dominated power systems; and electrified transportation. Dr. Ropp is passionate about the education of future electrical engineers and engages in education, mentorship and outreach whenever possible. He does occasionally still get to use his musical skills.



### **Dr. Brian Johnson, University of Washington**

Brian Johnson obtained his M.S. and Ph.D. degrees in Electrical and Computer Engineering from the University of Illinois at Urbana-Champaign, Urbana, in 2010 and 2013, respectively. He is the Washington Research Foundation Innovation Assistant Professor within the Department of Electrical and Computer Engineering at the University of Washington. Prior to joining the University of Washington in 2018, he was an engineer with the National Renewable Energy Laboratory in Golden, CO. He currently serves as an Associate Editor for the IEEE Transactions on Energy Conversion. His research interests are in renewable energy systems, power electronics, and control systems.



### **Brent Pryor, Black & Veatch**

Mr. Pryor has been in the construction industry for over 15 years. With over a decade of construction experience working on both domestic and international projects. Ranging from simple cycle gas power stations to one of the largest coal power stations in the world. Mr. Pryor is currently working with Black and Veatch as a Project Manager in the renewable energy division.



### **Michael Graves, Alliant Energy**

Michael Graves has a Bachelors of Science in Electrical Engineering from the University of Evansville (Indiana) and an MBA from University of Phoenix. He has over 22 years of experience in the Electric Utility Industry with 13 years at Alliant Energy. He is currently working in the Engineering Solutions department where smart grid equipment is piloted to ensure proper integration with Operations, Communications, and other departments. Besides assisting with other pilots, Mike has been the business owner for an off-grid PV/battery system that has been in operation for two years and is currently working on a reliability microgrid with scheduled completion in the third quarter of 2022.



### **Dr. David Schoenwald, Sandia National Laboratories**

David Schoenwald is a Principal Member of the Technical Staff in the Electric Power Systems Research Department at Sandia National Laboratories. Dr. Schoenwald focuses on control system design to improve dynamic stability of electric power systems. He also develops performance standards for grid-scale energy storage applications. Before joining Sandia, he was with Oak Ridge National Laboratory, where he designed control systems for manufacturing applications. He was also an adjunct assistant professor in the Electrical Engineering Department, University of Tennessee, Knoxville, where he taught a graduate course on nonlinear control systems. Dr. Schoenwald received an R&D 100 award in 2017 for development of an inter-area oscillation damping controller for the western North American power grid. He received the 2017 Outstanding Engineer Award of the Albuquerque Section of the IEEE. He served as Technical Co-Chair of the 2017 Electrical Energy Storage Applications & Technologies (EESAT) Conference. Dr. Schoenwald received his Ph.D. in electrical engineering from The Ohio State University.