Agenda
Distributed Energy Resources Workshop
Maintaining Reliability of the Bulk Power System with Integration of Large Amounts of Distributed Energy Resources

August 2, 2016 | 12:00 p.m. – 5:00 p.m. Eastern
August 3, 2016 | 8:00 a.m. – 12:00 p.m. Eastern

DoubleTree by Hilton - Buckhead
3342 Peachtree Road NE
Atlanta, GA 30326

NERC Staff Coordinator: Pooja Shah (Mobile: 404-710-0502)

Tuesday, August 2, 2016

12:00 – 1:00 Lunch

1:00 – 1:10 Welcome Remarks
• John Moura, Director, Reliability Assessment and Systems Analysis, NERC

1:10 – 1:25 Welcome Address
• Gerry Cauley, President and CEO, NERC

1:25 – 1:45 Keynote Speaker
• Allen Mosher, Vice President of Policy Analysis for the American Public Power Association

1:45 – 3:15 Panel 1 - Aligning the Definition of DERs – Moderated by Brian Evans-Mongeon
• Bill Chambliss, General Counsel, Virginia State Corporation Commission
• Howard Gugel, Director of Standards, NERC
• Lacey Ourso, Standards Developer, NERC
• Charlie Vartanian, Advanced Technologies Advisor, Mitsubishi Electric Power Products Inc.

3:15 – 3:30 Break

3:30 – 5:00 Panel 2 - Load and Generation Modeling – Moderated by Jason MacDowell
• Jens Boemer – Senior Technical Leader, Power Delivery and Utilization Sector, EPRI
• Andrew Mills, Staff Research Associate, Lawrence Berkeley National Laboratory
• Richard Tabors, President and Principal of Tabors Caramanis Rudkevich
7:00 – 8:00  Breakfast
8:00 – 8:15  Welcome Address
- Mark Lauby, Senior Vice President and Chief Reliability Officer, NERC
8:15 – 9:45  Panel 3 – Voltage and Frequency Performance & Essential Reliability Services – Moderated by Pooja Shah
  - John Simonelli, Director, Operations Support Services, ISO New England
  - Julia Matevosjana, Lead Planning Engineer, ERCOT
  - Mark Ahlstrom, Vice President, Renewable Energy Policy, NextEra Energy Resources
  - Rich Hydzik, Transmission Operations Engineer, Avista Corporation
9:45 – 10:00  Break
10:00 – 11:30  Panel 4 – Observability and Control – Moderated by Charlie Smith
  - Tom Hoff, Founder and President, Clean Power Research
  - Jim Reilly, Principal, Reilly Associates
  - Jessica Harrison, Director, Research and Development, Market Services Division, MISO
  - Clyde Loutan, Senior Advisor, Renewable Energy Integration, CAISO
11:30 – 12:00  Closing Remarks
  - Brian Evans-Mongeon, President, Utility Services Inc.
  - Todd Lucas, General Manager, Bulk Power Operations, Southern Company
  - Rich Hydzik, Transmission Operations Engineer, Avista Corporation
Panel Summary

1) **Aligning the Definition of Distributed Energy Resources (DER)** – Discuss how Distributed Energy Resources (DER) should be defined in NERC’s functional model, to support fair treatment of all resources while still distinguishing relevant differences between resources and various types of distributed resources. Outline what NERC’s role as an Electric Reliability Organization (ERO) could be in integrating these resources in the Bulk Power System in a reliable manner. In addition, this panel will provide State and Public Utilities Commission perspectives on DERs and how DER resources are defined in other parts of the industry. Acknowledge the transition in the Bulk Electric System (BES) that is projected with DERs and discuss the role of NERC in this future system.

2) **Load and Generation Modeling** – The increasing rate of DER penetration on the electric system has brought attention to modeling these resources. For reliability characteristics, this may require explicitly modeling of both the generation and demand components of DER sites rather than representing them as an aggregate “net load” resource. This panel will consider the projections of DER deployment, and attributes that are important for modeling DER. In addition, the panel will discuss multiple facets of modeling including, consideration of dynamic studies, determining the levels of DER at which point the explicit modeling of DER becomes necessary, and modeling DER for planning and operations.

3) **Voltage and Frequency Performance & Essential Reliability Services** – At significant levels, the characteristics and responses of DER can have impacts on reliable operation of the Bulk Power System. Specifically, essential services for reliability, such as supporting voltage and frequency, need to be maintained during a disturbance on the grid. Generation resources, which will increasingly include DER, must also have known voltage ride-through and frequency ride-through capabilities.

4) **Observability and Control** – As DER are integrated into the system, some level of visibility and control is important to the grid operator in order to provide reliable operation of the system. This concept plays a key role in the ability to forecast operations, optimize the use of the overall system, and when necessary, take emergency actions for reliability purposes. This panel discusses the options on how this should be done for reliability purposes.
Executive Profile

John Moura

Director of Reliability Assessments and System Analysis North American Electric Reliability Corporation (NERC)

John Moura is the Director of Reliability Assessment and System Analysis for the North American Electric Reliability Corporation (NERC), where he joined in 2008. Moura leads the Electric Reliability Organization’s efforts to independently assess and report on the overall reliability, adequacy, and associated risks of the interconnected North American bulk power system. Moura leads the development of NERC’s annual long-term and seasonal reliability assessments as well as NERC’s efforts for evaluating reliability impacts as a result of potential environmental regulations, accommodating high-levels of variable generation and an increasing dependence on natural gas. He is the co-author of numerous NERC special reports and several IEEE publications.

Moura coordinates the efforts of NERC’s Planning Committee and several other stakeholder groups that bring together the power industry’s leading experts on resource and transmission planning. In addition, Moura is actively engaged in multiple groups and committees across North America that are focused on power system risk and vulnerability analyses, loss of load studies, probabilistic resource adequacy modeling, and interconnection-wide power system modeling.

Moura earned his bachelor’s degree from Rutgers University.
Gerry W. Cauley assumed the role of president and chief executive officer of NERC in January 2010.

Mr. Cauley oversees NERC’s mission of assuring the reliability of the North American bulk power system. As president and CEO, Mr. Cauley directs key programs affecting more than 1,900 bulk power system owners, operators, and users, including mandatory reliability standards, compliance monitoring, enforcement, situation awareness, event and risk analysis, reliability assessments and forecasting, cyber and physical security, and government relations. Mr. Cauley also oversees the operations of eight Regional Entities who support the reliability mission across North America by implementing delegated responsibilities at the regional and local levels.

From 2007 to 2009, Mr. Cauley served as president and CEO of the SERC Reliability Corporation, one of the reliability Regions covering 16 states in the southeastern and central United States. During this time, he established new programs for monitoring and enforcing compliance with mandatory standards, developed training and educational programs and a program to track reliability recommendations.

Prior to his CEO career, Mr. Cauley served as vice president and director of Standards at NERC and was instrumental in preparing NERC’s application to become the government-certified electric reliability organization. He spearheaded the development of an initial set of mandatory standards to ensure the reliability of the bulk power system in North America. Mr. Cauley was also a lead investigator of the August 2003 Northeast blackout and coordinated the NERC Y2k program, supervising the reporting and readiness of 3,100 electric organizations in the United States and Canada.

Over a 35-year career, Mr. Cauley has been driven by a keen interest in serving the public while performing roles of increasing responsibility in the areas of electricity reliability and nuclear safety. He served as the program manager for grid operations and planning at the Electric Power Research Institute. He was a training consultant and established comprehensive reliability and safety training programs at dozens of electric utilities for electric system operations, nuclear and fossil plant operations, substations, and distribution systems. Prior to his career in the power industry, Mr. Cauley served five years as an officer in the U.S. Army Corps of Engineers.

Mr. Cauley earned a bachelor’s degree from the U.S. Military Academy at West Point, a master’s degree from the University of Maryland in nuclear engineering, and a master’s degree in business administration from Loyola College - Baltimore. Mr. Cauley is a registered Professional Engineer in the Commonwealth of Virginia. Mr. Cauley also serves on the Board of Directors for the United States Energy Association.
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Allen Mosher
Vice President of Policy Analysis for the American Public Power Association

Mr. Mosher is Vice President of Policy Analysis for the American Public Power Association, where he directs development of APPA’s positions on federal regulatory policy issues. He has participated in numerous technical conferences before the Federal Energy Regulatory Commission and testified at Senate Energy and Natural Resources Committee hearings concerning the formation of the North American Electric Reliability Corporation and proposed cyber-security legislation. Most recently, he was a panelist at the Federal Trade Commission’s June 2016 workshop on competition and consumer protection issues in solar energy. Mr. Mosher serves as an observer of the NERC Board of Trustees and is past-chair of the NERC Standards Committee.

Mr. Mosher is the staff leader for APPA’s Public Power Forward strategic initiative to help public power utilities anticipate and respond to new technologies and trends in distributed energy resources that are reshaping relationships between utilities and their customers.

Before joining APPA in July 1998, Mr. Mosher was a policy analyst for the FERC, where he participated in Commission electric restructuring policy development, including development of open-access transmission tariffs, electric utility merger conditions, and the Commission’s rules for independent system operators.

Mr. Mosher holds the master of public policy degree from the University of California at Berkeley and was a post-graduate fellow in the Berkeley Professional Studies Program in India where he studied the Indian electric power sector. He graduated with honors from the University of Kansas and is a member of Phi Beta Kappa.

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Brian Evans-Mongeon
Vice Chair of the NERC Planning Committee, RISC, DERTF, and Co-Chair of the ERSWG.

Utility Services assists registered entities in their Electric Reliability Organization obligations and other NERC program efforts. In 2007, after 20 years at Green Mountain Power and Vermont Public Power Supply Authority, Utility Services was formed and serves all aspects of the various ERO and NERC programs. We help organizations identify the proper registrations, implement compliance programs, assist in standard development, and work on data requests and submissions. Utility Services is a member of ISO New England, NERC, NPCC, FRCC, RF, MRO, and WECC. Many of its staff members serve on regional working groups and task forces. Brian
presently serves as the Vice Chair of the NERC Planning Committee, RISC, DERTF, and is Co-Chair of the ERSWG.
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Bill Chambliss
General Counsel, Virginia State Corporation Commission

Bill Chambliss has been General Counsel of the Virginia State Corporation Commission (SCC) since 2000. The Virginia SCC is an independent department of the state government, established by the Virginia Constitution and responsible for a number of activities, including regulation of public utilities in the Commonwealth.

Mr. Chambliss leads a staff of 13 attorneys in representing the Commission Staff in these matters, which include numerous transmission siting cases. He is a state regulatory agency representative to the NERC Operating Committee and a member of the NARUC and MACRUC Staff subcommittees for electricity.

Mr. Chambliss graduated with highest honors from the University of Kentucky and its College of Law.

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Howard Gugel
Senior Director, Standards, and Education North American Electric Reliability Corporation (NERC)

Howard Gugel is the Senior Director, Standards, and Education for the North American Electric Reliability Corporation (NERC). In this role, he is responsible for directing all aspects of NERC’s continent-wide standards development process by providing oversight, guidance, and coordination. This is to assist in the timely development of technically excellent reliability standards that ensure an adequate level of reliability of the bulk power system.

Prior to serving in this position, Gugel was the director of performance analysis at NERC. His primary responsibility in that role was the development, maintenance, and analysis of reliability performance metrics, including those in NERC’s annual State of Reliability Report. This includes analysis of various databases of transmission and generations outages to look for statistically significant trends.

Prior to joining NERC, Gugel was with Progress Energy Florida in the roles of transmission area maintenance manager and transmission planning manager. His background also includes management experience in transmission operations and energy marketing. Gugel received his BSEE and MSEE from the University of Missouri –Rolla. He is a licensed professional engineer in the state of Missouri.
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Lacey Ourso
Standards Developer at North American Electric Reliability Corporation (NERC)

Lacey Ourso currently serves as a Standards Developer. Lacey began at NERC in September 2012 in our Atlanta office as the Senior Compliance Specialist, and in 2014, she transitioned to a Regional Relations role. Prior to NERC, Lacey practiced law in the State of Georgia beginning in 2006, specializing in representation of engineers and other design professionals. Lacey is from Baton Rouge, Louisiana and she attended Louisiana State University for both her undergraduate and law school education. In 2003, she graduated cum laude with a Bachelor of Science degree in Business Administration, and then in 2006 a Juris Doctorate and Bachelor of Civil Law degree. She is also a certified Project Management Professional (PMP).

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Charlie Vartanian
Advanced Technologies Advisor at Mitsubishi Electric’s Power Systems Group.

Mitsubishi Electric Power Products, Inc. (MEPPI) provides medium and high voltage equipment through full turnkey FACTS (Flexible AC Transmission System) and energy storage solutions for electric utility clients.

Charlie has over 25 years of power industry experience developing and marketing advanced grid solutions, performing electric system studies, and contributing to IEEE standards development including leadership roles in IEEE 1547 and IEEE 2030 working groups. Charlie also co-chairs the EPRI ESIC Energy Storage Commissioning Guidelines subgroup.

At MEPPI, Charlie contributes to new product development and product sales management. His current focus is on advanced grid products including FACTS and energy storage. Previous employers include DNV KEMA, Enron Energy Services, A123 Systems, and Southern California Edison. During his 15 years at Southern California Edison, Charlie’s activities spanned traditional T&D planning through R&D. Charlie is a licensed professional electrical engineer and a Senior IEEE member.
Executive Profile

Jason MacDowell
Manager – Renewables, Controls & Protection GE Energy Management Energy Consulting

Jason MacDowell is the Manager of the Renewables, Controls and Protection segment of GE’s Energy Consulting business, where he leads a global team focused on power system analysis, thermal and renewable generation integration analysis, compliance testing and assessment, custom hardware solutions for generator protection and controls and power system consulting. He brings over 16 years of energy industry experience on power systems engineering analysis and operation, interconnecting thermal and renewable generation into the bulk power system, wind turbine and renewable plant electrical design, load flow and stability modeling, power plant performance testing, sub-synchronous resonance and generator protection and has led multiple programs and studies on these subjects. He has lectured and provided consultation regarding growth and interconnection of renewable energy systems to many governments, policy makers, grid companies, generation owners and universities around the world and has been a key contributor to the development of multiple grid codes, regulations and standards worldwide specifically addressing thermal and renewable generation. He spent nearly three years living as an expatriate in Beijing, China providing consultation to Chinese policy makers, utilities, design institutes and generation owners to develop higher levels of wind energy penetration, co-develop a grid code for wind energy and provide solutions for sub-synchronous resonance.

Mr. MacDowell is an instructor of GE’s PSEC power systems fundamentals, protective relaying and renewable energy courses in Schenectady, New York and of UVIG’s Short Course on interconnection and performance of renewable generation. He has authored over 55 technical publications, standards, codes and regulations, is a member of IEEE, of NERC Integration of Variable Generation Task Force (IVGTF), NERC Essential Reliability Services Task Force and Working Group (ERSTF & ERSWG), IEEE Power System Dynamics Performance Committee, IEEE Standards Board, AWEA Wind Standards Committee, RENEW Northeast, IEC US National Committee Head of Delegation for TC8 and SC8A and USNC delegate for TC88, a balloting member of NERC Generator Verification Standards Drafting Team (GVS DT) and IEEE 1547 standards development team. He is the Chair of IEEE Std. 551-2006 and of NERC IVGTF 1-3 on interconnection requirements for variable energy resources. He is an appointed US Delegate of the China Quality Conference, invited to represent the global energy industry regarding quality, reliability and standardization by China’s Premier of the State Council, The Honorable Li Keqiang. Mr. MacDowell is also the recipient of the UVIG achievement award for ongoing contributions to industry standards activities through NERC, IEEE and IEC.
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Executive Profile

Jens Boemer

Senior Technical Leader Grid Operations and Planning Power Delivery and Utilization

Jens Boemer, Ph.D., is a Senior Technical Leader in the Grid Operations and Planning group of the Power Delivery and Utilization Sector at the Electric Power Research Institute (EPRI).

In his current position, he leads projects on the grid integration of renewable and distributed energy resources with a focus on power system stability issues. His areas of expertise include interconnection guidelines, aggregated modeling of wind generation and distributed solar photovoltaics for bulk power system reliability studies, and consulting on strategic planning for integration of renewables. Boemer is contributing to timely revisions of IEEE Standard 1547, particularly on the frequency and voltage ride-through sections and was lead author of an EPRI white paper that gives recommendations for the minimum ride-through requirements from a bulk system perspective.

Boemer is uniquely skilled to balance power system aspects from a technical viewpoint with stakeholder interests to create practical solutions for the overall benefit of society. This enables him to support technical and regulatory decision making with solid technical foundation.

Jens Boemer joined EPRI in November 2014 with 10 years of experience in technical and regulatory requirements that helped to facilitate the German “Energiewende” (energy transition). In 2013/2014, he studied at Delft University of Technology, The Netherlands, in the Intelligent Electrical Power Grids group of the Electrical Sustainable Energy department from where he obtained a Ph.D. degree in 2016. Until October 2012 Boemer was Senior Consultant in the Power Systems and Markets Group at the Ecofys premises in Berlin, Germany. He received his Dipl.-Ing. in Electrical Engineering from Technical University of Dortmund, Germany, in 2005 where he specialized on power systems and renewable energies.

Boemer is member of IEEE, CIGRÉ, and VDE.
Andrew Mills
Research Scientist in the Electricity Markets and Policy Group at Lawrence Berkeley National Laboratory

Andrew Mills is a Research Scientist in the Electricity Markets and Policy Group at Lawrence Berkeley National Laboratory. Andrew conducts research on the integration of variable generation into the electric power system, evaluating the costs, benefits, and institutional needs of renewable energy transmission and other supporting infrastructure. Andrew has a Ph.D. in Energy and Resources from UC Berkeley and a B.S. in Mechanical Engineering from the Illinois Institute of Technology.

Richard Tabors
President and Principal of Tabors Caramanis Rudkevich

Richard D. Tabors, Ph.D. is an economist and scientist with over 35 years of domestic and international experience in energy planning and pricing, international development, and water and wastewater systems planning. He is currently President and Principal of Tabors Caramanis Rudkevich an energy, water and wastewater consulting group in Boston, and Visiting Scholar and co-director of the Utility of the Future Project at the MIT Energy Initiative. Prior to forming Tabors Caramanis Rudkevich Dr. Tabors was Vice President of Charles River Associates.

From 1976 until 2006, Dr. Tabors held a variety of position at Massachusetts Institute of Technology culminating in the title of Senior Research Engineer and Senior Lecturer. These positions involved research development and supervision as well as academic teaching and included being Assistant Director of the power systems engineering laboratory (LEES) and associated director of the Technology and Policy master’s program. Prior to MIT Dr. Tabors was Assistant Professor of City and Regional Planning and a member of the teaching faculty of the College of Arts & Sciences at Harvard University. At present, he is a visiting professor of Electrical Engineering at the University of Strathclyde, Glasgow, Scotland from which he received an Honorary Doctorate of Science in Engineering in July of 2015.

Dr. Tabors was a member of the team at MIT that developed the theory of spot pricing (Spot Pricing of Electricity Kluwer Academic, 1989) upon which real-time pricing (RTP) and locational marginal pricing (LMP) of electricity and transmissions services are based. Dr. Tabors current research and consulting work is focused on the theory, development and implementation of locational marginal prices applied to the distribution system, DLMPs.
Executive Profile

Mark Lauby

Mark G. Lauby is senior vice president and chief reliability officer at the North American Electric Reliability Corporation (NERC). Lauby joined NERC in January 2007 and has held a number of positions, including vice president and director of standards and vice president and director of Reliability Assessments and Performance Analysis.

In 2012, Lauby was elected to the North American Energy Standards Board and was appointed to the Department of Energy’s Electric Advisory Committee by the secretary of energy in 2014. Lauby has served as chair and is a life member of the International Electricity Research Exchange. He also served as chair of a number of IEEE working groups. From 1999 to 2007, Lauby was appointed as a member of the Board of Excellent Energy International Co., LTD, an energy service company based in Thailand. He has been recognized for his technical achievements in many technical associations, including the 1992 IEEE Walter Fee Young Engineer of the Year Award. He was named a fellow by IEEE in November 2011 for “leadership in the development and application of techniques for bulk power system reliability,” and in 2014, Mr. Lauby was awarded the IEEE Power and Energy Society’s Roy Billinton Power System Reliability Award.

Prior to joining NERC, Lauby worked for the Electric Power Research Institute (EPRI) for 20 years, holding a number of senior positions, including: director, power delivery and markets; managing director, Asia, EPRI International; and manager, Power System Engineering in the Power System Planning and Operations Program. Lauby began his electric industry career in 1979 at the Mid-Continent Area Power Pool in Minneapolis, Minnesota. His responsibilities included transmission planning, power system reliability assessment and probabilistic evaluation.

Lauby is the author of numerous papers on the subjects of power system reliability, expert systems, transmission system planning, and power system numerical analysis techniques. He earned his bachelor of science and master of science degrees in electrical engineering from the University of Minnesota. In addition, Lauby attended the London Business School Accelerated Development Program.
Pooja Shah
Senior Engineer with the Reliability Assessment and System Analysis Group at North American Electric Reliability Corporation (NERC)

Pooja Shah is a Senior Engineer with the Reliability Assessment and System Analysis Group at North American Electric Reliability Corporation (NERC). She successfully led NERC’s Essential Reliability Services Task Force (ERSTF) to completion, and now continues to lead the efforts for Essential Reliability Services Working Group (ERSWG) and Distributed Energy Resources Task Force (DERTF). She also leads NERC’s seasonal assessments, short-term assessments, supports other long-term reliability projects, cross-functional teams and special assessment projects. In her current position, Pooja leads the ERSWG and DERTF activities that focus on sustaining the essential services needed to maintain Bulk Power System Reliability in the face of retiring base load generating plants and integration of variable energy resources. Prior, Pooja has worked as a Senior Reliability Risk Assurance Engineer with Bulk Power System Awareness group where she managed reliability risk assurance projects. Pooja is also the winner of 2015 Atlanta IEEE – PES Young Engineer of the Year award.

Before NERC, Pooja worked as a Senior Engineer for Public Service of New Hampshire, Northeast Utilities. She has extensive experience in Distribution and Transmission operations, and planning. She handled projects that addressed southern New Hampshire load growth, by construction of new substations, distribution lines and distributed generation projects. She also worked with other departments on projects for proposed wind farms on distribution systems, and special planning projects. She successfully conducted System Loss Studies for two years, which incorporated losses on the New Hampshire system from transmission to customer meter. In operations arena, she was responsible for modeling, and maintaining the state estimator for New Hampshire system.

She received her Bachelor of Science in Electrical Engineering from University of New Hampshire, and Master of Science in Electrical Engineering from Worcester Polytechnic Institute. Pooja also holds Graduate Certificate in Power Systems Management from Worcester Polytechnic Institute.
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John Simonelli
Director of Operations Support Services - ISO New England

John is the Director of Operations Support Services at ISO New England where he has been involved for over 37 years in Bulk Power System Operations, Transmission System Planning and, Wholesale Electric Market Operations. Currently John’s primary areas of responsibility are transmission and generation outage coordination within the region, complex engineering studies support of real-time reliable operation of the Bulk Power System, event reconstruction, system restoration, frequency response and, project management support for key operational initiatives.

Over his career, he has served in many positions on various NERC, NATF, NPCC and other ad hoc industry groups. He is currently serving as the Chairman of the Voltage and Reactive Sub-team of the NERC Essential Reliability Services Working Group (ERSWG) focused on the impact of the changing resource mix on system requirements for voltage control, frequency support, and ramping capability to maintain reliability.

John has his Bachelor of Science degree in Electrical Power Systems Engineering from Northeastern University and has completed advanced management courses at Eckerd College and Rensselaer Polytechnic Institute School of Management.

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Julia Matevosyan
Lead Planning Engineer at Electric Reliability Council of Texas (ERCOT)

Julia Matevosyan has over 10 years of experience in system planning and wind power integration into power systems. Her PhD and postdoctoral research at the Royal Institute of Technology (KTH), Sweden, was on large-scale integration of wind generation in power systems and optimal coordination of wind and hydropower for efficient use of available transmission capacity. She has broad experience with and has written a number of publications on grid interconnection requirements (Grid Codes) for wind generation resources in Europe and the US. In her previous role as Senior Electrical Engineer at the consulting firm Sinclair Knight Merz (currently Jacobs), she was involved in a number of grid interconnection and grid code compliance studies for wind power plants in the UK. Julia has authored and co-authored over 30 publications, including journals, conference proceedings and book contributions.

She is currently Lead Planning Engineer at Electric Reliability Council of Texas (ERCOT), Resource Adequacy Group, primarily working on operating reserve adequacy for future generation scenarios with large amounts of solar and wind generation. Her main interest are adequacy of system inertial response, system flexibility and frequency performance issues related to high penetration levels of renewable
generation as well as integration of distributed generation, demand response and storage. She is one of the SMEs involved in improving Ancillary Services for the ERCOT system. She is also Frequency Response subgroup lead of NERC Essential Reliability Services Working Group.
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**Mark Ahlstrom**  
*Vice President of Renewable Energy Policy for NextEra Energy Resources and WindLogics*

Mark Ahlstrom is Vice President of Renewable Energy Policy for NextEra Energy Resources and WindLogics, NextEra’s subsidiary known for meteorology, energy analytics and renewable energy integration. NextEra is North America’s largest generator of renewable energy from the wind and sun. Mark is particularly interested in the reliable integration of variable generation into power systems and markets. He is actively involved at the North American Electric Reliability Corporation (NERC) on their Essential Reliability Services Working Group and activities across North America to facilitate very high levels of clean energy.

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**Executive Profile**

**Rich Hydzik**  
*Senior Transmission Operations Engineer, Avista Corp*

Rich Hydzik is a Senior Transmission Operations Engineer at Avista. He has worked in System Operations since 2004 with responsibilities for operational powerflow studies, coordination of regional contingency reserve programs, system operating procedures, and organizational compliance with various NERC BAL, INT, PRC, TOP, and VAR standards. Prior to working in System Operations, he was a system protection engineer for ten years on generation, distribution, and transmission (69kV through 500kV) applications. He worked for three years as a transmission system-planning engineer.

Rich earned his bachelor’s degree from Gonzaga University.
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J. Charles Smith
*Executive Director Utility Variable-Generation Integration Group*

Mr. Smith is a member of the IEEE Power and Energy Society; a member of CIGRE, the International Council on Large Electric Systems; a member of the American Meteorological Society; and a Fellow of the IEEE. He is a guest editor for the IEEE Power and Energy magazine, and a past editor for the IEEE Transactions on Sustainable Energy. Mr. Smith received the IEEE PES Ramakumar Family Renewable Energy Excellence Award in 2014.

He received his BSME and MS degrees from MIT in 1970. He currently serves as the Executive Director of the Utility Variable-Generation Integration Group (UVIG). Previously, he served as President of Electrotek Concepts, a power engineering consulting firm. He has 45 years of experience in the electric power industry.

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Tom Hoff
*Founder and President, Research & Consulting Clean Power Research*

Tom Hoff is the Founder of Clean Power Research and President of its Research and Consulting Group. Tom pioneered the science of valuing distributed solar generation, and holds several patents in the area of PV fleet power estimation. His research in areas such as the value of PV, risk management and renewables, and methods to characterize PV intermittency are integrated into the company’s commercial grade software services. These include SolarAnywhere, PowerClerk and PowerBill.

Most recently, Tom’s research has been focused on development of new strategies for utilities to cost-effectively integrate increased renewables onto the grid through electrification of homes and personal transportation combined with solar.

Tom began his career at Pacific Gas and Electric Company. He holds a Ph.D. from Stanford University’s School of Engineering.
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James T. Reilly  
*Principal of Reilly Associates*

James T. Reilly, principal of Reilly Associates, is an independent consultant in the electric power industry in the U.S. and internationally. Jim provides consulting services to the U.S. Department of Energy Office of Electricity on programs for grid modernization, microgrids, and resiliency. He is a member of the Technical Advisory Group for the DOE FOA 997 project on *Microgrid Research, Development, and System Design*.

Jim is the lead for the NIST /SGIP Priority Action Plan #24 *Microgrid Operational Interfaces*.

Jim is a member of the working groups for standards for the interconnection and interoperability of distributed energy resources (IEEE P1547-REV), interoperability of storage with distribution systems (IEEE P2030.2), and microgrid controller specifications and testing (IEE P2030.7/8).

The author of numerous articles and research studies, Jim is a contributor to the report *The Advanced Microgrid, Integration and Interoperability*, released by Sandia National Laboratories in March 2014 and co-author of *The Sendai Microgrid Operational Experience in the Aftermath of the Tohoku Earthquake: A Case Study*.

Jim is a Senior Member of the IEEE Power Engineering Society and holds degrees from Georgetown University and Columbia University.

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Jessica Harrison  
*Director of Research and Development Marketing Services Division MISO*

Jessica Harrison is Director of Research and Development (R&D) in the Market Services division of MISO. In this role, she coordinates MISO’s R&D policies, objectives, and initiatives. Her focus includes pursuing R&D initiatives and partnerships, researching emerging technologies and supporting the integration of future grid resources.

Jessica has a diverse background in clean energy, including experience with engineering analysis, public policy and economic analysis. Prior to joining MISO, she was the Head of Section of Distributed Energy Resources at DNV GL. As an industry consultant, Jessica has studied the impacts of integrating innovative technologies such as distributed energy resources, energy storage and demand response with the electricity grid and the electricity wholesale markets.
Ms. Harrison holds dual Master of Science degrees from the Massachusetts Institute of Technology in Technology and Policy and in Civil and Environmental Engineering, and a Bachelor of Science degree in Physics from the University of Michigan.
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Clyde Loutan
*Senior Advisor at the California Independent System Operator Corporation (ISO)*

Clyde Loutan is presently a Senior Advisor at the California Independent System Operator Corporation (ISO) focusing on power system operation performance and was the Principal Investigator for the ISO’s renewable resource integration studies published in 2007 and 2010. Mr. Loutan serves on the North American Electric Reliability Corporation (NERC) Frequency Responsive Reserve, and the NERC Reliability Based Control Standards teams developing national operating standards. Mr. Loutan previously worked at the Pacific Gas and Electric Company for 14 years in various capacities such as Real Time System Operations, Transmission Planning and High Voltage Protection.

Mr. Loutan is a licensed professional engineer in the State of California. He holds B.S. and M.S. degrees in Electrical Engineering from Howard University in Washington D.C., and is a senior member of the IEEE.

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Todd E. Lucas
*General Manager, Bulk Power Operations Southern Company*

Todd began his career with Georgia Power in 1982 as a Cooperative Education student. His first full time assignment was in Americus, Georgia as a Distribution Engineer. Over his 34-year career within Southern Company, he has held various supervisory and management positions in Distribution Engineering & Operations, Transmission System Operations, Transmission and Distribution Planning, Transmission Maintenance, and Project Management. He is currently the General Manager of Bulk Power Operations at Southern Company Services where he oversees the real time operations of the Bulk Electric System for Southern Company and Reliability Coordination for the Southeastern Sub-region of SERC. He currently represents the Investor Owned Utility Sector on the NERC Operating Committee and is Co-chair of the NERC Essential Reliability Services Task Force.

Todd graduated from Georgia Tech with a Mechanical Engineering degree in 1986 and was a 2008 graduate of the Harvard Business School General Management Program.