

# Agenda

## PJM General Session

### Exploring the Intersection of Decarbonization and Reliability

Via Webex

May 4, 2021 | 9:30 a.m. to 12:30 p.m.

9:30 a.m. **Welcome**

**Manu Asthana**, President and CEO, PJM Interconnection

9:45 a.m. **Keynote: The NERC Perspective**

**James Robb**, President and CEO, North American Electric Reliability Corporation

10:15 a.m. **Panel Discussion – Exploring the Intersection of Decarbonization and Reliability**

Panel moderated by **Mike Bryson**, Sr. Vice President – Operations, PJM Interconnection

**The Honorable Patricia Hoffman**, Acting Assistant Secretary, Principal Deputy Assistant Secretary – Office of Electricity, U.S. Department of Energy

**Antoine Lucas**, Vice President – Engineering, Southwest Power Pool

**Elliott Nethercutt**, Principal Researcher, National Regulatory Research Institute

**Phil Pettingill**, Director – Regional Integration, California Independent System Operator

11:30 a.m. **Break**

11:40 a.m. **Overview of PJM’s Reliability and Renewable Integration Analyses**

**Emanuel Bernabeu**, Director – Applied Innovation & Analytics, PJM Interconnection

12:25 p.m. **Closing Remarks**

**Manu Asthana**, President and CEO, PJM Interconnection

**Anti-trust:**

You may not discuss any topics that violate, or that might appear to violate, the antitrust laws including but not limited to agreements between or among competitors regarding prices, bid and offer practices, availability of service, product design, terms of sale, division of markets, allocation of customers or any other activity that might unreasonably restrain competition. If any of these items are discussed the chair will re-direct the conversation. If the conversation still persists, parties will be asked to leave the meeting or the meeting will be adjourned.

**Code of Conduct:**

As a mandatory condition of attendance at today's meeting, attendees agree to adhere to the PJM Code of Conduct as detailed in PJM Manual M-34 section 4.5, including, but not limited to, participants' responsibilities and rules regarding the dissemination of meeting discussion and materials.

**Public Meetings/Media Participation:**

Unless otherwise noted, PJM stakeholder meetings are open to the public and to members of the media. Members of the media are asked to announce their attendance at all PJM stakeholder meetings at the beginning of the meeting or at the point they join a meeting already in progress. Members of the Media are reminded that speakers at PJM meetings cannot be quoted without explicit permission from the speaker. PJM Members are reminded that "detailed transcriptional meeting notes" and white board notes from "brainstorming sessions" shall not be disseminated. Stakeholders are also not allowed to create audio, video or online recordings of PJM meetings. PJM may create audio, video or online recordings of stakeholder meetings for internal and training purposes, and your participation at such meetings indicates your consent to the same.

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## Summary & Biographies

This General Session is designed to engage in discussion regarding reliability needs to support decarbonization efforts. We will hear from industry experts on reliability needs that will emerge as our system continues to decarbonize. Further, PJM will provide an overview of reliability and renewable integration analyses it has been conducting.



**James B. Robb**

*President and  
Chief Executive  
Officer*

James B. Robb assumed the role of NERC's president and chief executive officer in April 2018. Robb oversees NERC's mission of assuring the reliability and security of the North American bulk power system. As president and CEO, Robb leads the Electric Reliability Organization (ERO) responsible for key programs affecting approximately 1,400 bulk power system users, owners and operators, including those programs focused on development of mandatory NERC Reliability Standards, the Compliance Monitoring and Enforcement Program, situational awareness, event and risk analysis, reliability assessments and forecasting, and cyber and physical security. He is also responsible for the performance of the Electricity Information Sharing and Analysis Center (E-ISAC) and key government partnerships.

As CEO, he is the chair of the ERO Enterprise Executive Committee, which oversees the operations of the six Regional Entities that support the reliability mission across North America. Robb joined the ERO Enterprise in 2013 when he was appointed the president and CEO of the Western Electricity Coordinating Council (WECC), the Regional Entity serving the Western Interconnection.

Robb has more than 35 years of experience in the energy sector as an engineer, a consultant and a senior executive. Prior to becoming WECC's CEO, he held three major leadership roles in the industry as Senior Vice President at Northeast Utilities (now Eversource Energy); Senior Vice President at Reliant Energy (now part of NRG Energy); and as a Partner at McKinsey & Company. During his 15-year career at McKinsey, he worked closely with prominent electric power companies in California, western Canada, the Pacific Northwest and the Rocky Mountain states and served clients in Western Europe, South America and New Zealand. He has been a frequent speaker at industry events on the evolution of the electric power system, cybersecurity, integration of variable generation, and the increasing interdependency of electric and natural gas reliability.

Robb is a member of the Electricity Subsector Coordinating Council (ESCC) and serves on the United States Energy Association Board as well as a NERC trustee. In 2020 he was appointed Chair of the Group of Experts on Cleaner Energy Systems for the United Nations Economic Commission for Europe. He has served on the boards of the Wadsworth Atheneum Museum of Art in Hartford, Connecticut, the Houston Symphony, the Woodland Park Zoo in Seattle, and as a policy advisor to the Bay Area Economic Forum in San Francisco.

Robb earned a bachelor's degree in Chemical Engineering from Purdue University in Indiana and a master's degree in Business Administration from the Wharton School of Business at the University of Pennsylvania in Philadelphia.



**Michael E. Bryson**

*Senior Vice  
President –  
Operations*

Michael E. Bryson, Senior Vice President – Operations, is responsible for PJM’s Operations Division, overseeing 24/7 transmission operations for real-time systems. This includes scheduling, transmission dispatch, generation dispatch, reliability coordination, training and all engineering analysis required to run the system and support the critical energy management systems.

Bryson also held the positions of executive director of system operations, general manager of dispatch operations and manager of the Transmission Department for the System Operations Division. He was responsible for PJM’s transmission operations support for real-time operations to include transaction scheduling, transmission analysis, and regional and seasonal studies.

Bryson is a member of the Consortium for Electric Reliability Technology Solutions and the ISO/RTO Operating Committee. He serves on the board of PJM Technologies, Inc. and PJM Repository Information Services, Inc. He is currently the board chair of The House, a Women’s Outreach in Phoenixville, Pennsylvania. Bryson was formerly on the board of directors of the ReliabilityFirst Corporation and was the former chair of the board of Pope John Paul II High School.

Prior to joining PJM, Bryson held various senior-level positions with DIMAC DIRECT, Inc. in St. Louis, including vice president of information services, manager of operations and technical services, and manager of applications development.

Bryson has nearly ten years of military experience as a pilot. He was awarded the Bronze Star for Combat Service in Desert Storm.

His responsibilities in the United States Army included operations planning and support, supervision and training of pilots and mechanics, and tactical computer systems training and maintenance.

Bryson earned a Bachelor of Science in general engineering from the United States Military Academy at West Point, New York, focusing on computer science and electrical engineering, and has a Master of Business Administration from Saint Joseph’s University in Philadelphia. Bryson also earned a graduate certificate in power engineering from the Worcester Polytechnic Institute.



***The Honorable  
Patricia Hoffman***

*Acting Assistant  
Secretary, Principal  
Deputy Assistant  
Secretary – Office  
of Electricity*

Serving as the Principal Deputy Assistant Secretary for the Office of Electricity (OE) at the U.S. Department of Energy (DOE), Ms. Patricia A. Hoffman also served as Acting Under Secretary for Science and Energy from January 2017 until November 2017 when the U.S. Senate confirmed Mark Menezes as Under Secretary of Energy. Ms. Hoffman served as Acting Assistant Secretary for OE from January 2017 until October 2017 when the OE Assistant Secretary was confirmed by the U.S. Senate.

Ms. Hoffman was named Assistant Secretary for OE from June 2010 to January 2017, after serving as Principal Deputy Assistant Secretary since November 2007. The focus of her responsibility was to provide leadership on a national level to modernize the electric grid, enhance the security and reliability of the energy infrastructure and facilitate recovery from disruptions to the energy supply both domestically and internationally. This is critical to meeting the Nation's growing demand for reliable electricity by overcoming the challenges of our Nation's aging electricity transmission and distribution system and addressing the vulnerabilities in our energy supply chain.

Prior to her current position, Ms. Hoffman served in a dual capacity as Deputy Assistant Secretary (DAS) for Research and Development (R&D) and Chief Operating Officer (COO) within OE. During her tenure as the DAS for R&D, she developed the long-term research strategy and improved the management portfolio of research programs for modernizing and improving the resiliency of the electric grid. This included developing and implementing sensors and operational tools for wide-area monitoring, energy storage research and demonstration, and the development of advanced conductors to increase the capacity and flexibility of the grid. She also initiated a new research effort focused on integrating and distributing renewable energy through the electric grid, such as promoting plug-in hybrid electric vehicles and implementing smart grid technologies to maintain system reliability. As COO, she managed the OE business operations, including human resources, budget development, financial execution and performance management.

Prior to joining OE, she was the Program Manager for the Federal Energy Management Program within the Office of Energy Efficiency and Renewable Energy at DOE. This program guides the Federal government to "lead by example" promoting energy efficiency, renewable energy and smart energy management. Complementing her building energy efficiency experience, she also was the Program Manager for the Distributed Energy Program, which conducted research on advanced natural gas power generation and combined heat and power systems. Her accomplishments included the successful completion of the Advanced Turbine System program resulting in a high-efficiency industrial gas turbine power generation product.

Ms. Hoffman holds a Bachelor of Science and a Master of Science in Ceramic Science and Engineering from Pennsylvania State University.



**Antoine Lucas**  
*Vice President –  
Engineering*

As vice president of engineering, Lucas is responsible for the ongoing development of SPP's transmission expansion plan, administration of generator interconnection and transmission service processes, assessment of resource adequacy, and performance of compliance activities related to the NERC planning coordinator function.

Lucas formerly was SPP's director of system planning. Prior to joining SPP, Lucas worked in real-time system operations for Entergy Services, Inc. in roles as an engineer and system operator. Lucas earned a master's degree in business administration from the University of Arkansas-Little Rock and a bachelor's degree in industrial engineering from Louisiana Tech University.



**Elliott J.  
Nethercutt**  
*Principal  
Researcher*

Elliott J. Nethercutt is a Principal Researcher at the National Regulatory Research Institute (NRRI) where he specializes in state and federal energy policy issues. Previously, he advanced market design enhancements at the California Independent System Operator (CAISO), developed reliability assessments at the North American Electric Reliability Corporation (NERC), and supported transmission siting efforts and smart grid funding programs at the U.S. Department of Energy (DOE). Elliott earned a bachelor's degree in economics from the University of Colorado and a master's degree in applied economics from the Johns Hopkins University.





**Phil  
Pettingill, P.E.**

*Director – Regional  
Integration*

Phil Pettingill currently serves as Director of Regional Integration at the California Independent System Operator Corporation (ISO). In his most recent role, he coordinated the project to provide Reliability Coordinator services to the ISO balancing area and offer those services to other balancing authorities and transmission operators in the western United States. In many forums, he serves as an external spokesperson to provide expertise between the ISO and policymakers. He also engages in many regulatory initiatives supporting California's environmental goals, including achieving the 60 percent renewable portfolio standard in 2030 and 100% carbon-free energy by 2045.

He has served in various significant capacities at the ISO, representing the main grid operator for California before western state regulatory agencies and working with a diverse set of policymakers to ensure regulatory and policy initiatives consider impacts on the electric system operated by ISO and the customers it serves.

Mr. Pettingill joined the ISO in September 1997 after working at Pacific Gas and Electric for 15 years. He is a licensed electrical engineer and has a Bachelor of Science in Electrical Engineering from California State University, Sacramento and Master of Business Administration from St. Mary's College, California.



**Emanuel Bernabeu**  
*Director – Applied  
Innovation &  
Analytics*

Emanuel Bernabeu leads the Applied Innovation & Analytics Department at PJM, a cross-silo team that focuses on research and development and special studies.

His team embraces innovation and fosters collaboration with PJM's members, national laboratories, industry and universities to operationalize emerging technologies. Some examples are synchrophasors, enhanced situational awareness, Dispatch Interactive Map Application, voltage optimization and topology control. The Applied Innovation Department also conducts special studies that require advanced modeling techniques, such as energy management systems, geomagnetic disturbances, physical attacks, cascading outages and voltage stability.

Prior to joining PJM, Bernabeu spent five years with Dominion Virginia Power in Richmond, Virginia, holding a consultant engineering position.

Bernabeu has a Bachelor of Science in electronics from the Universidad Catolica de Cordoba, and a Master of Science in power systems, a Master of Science in applied economics and a Ph.D. in power systems from Virginia Tech.