Reliability of the Bulk Power System in an Evolving Grid
Educational Sessions
Co-sponsored by ESIG, NARUC, NASEO, and NASUCA

May 6, 2021	**Resource Adequacy**
2 pm ET	*Introduction and orientation to training sessions* – Danielle Sass Byrnett, NARUC and Dr. Debra Lew, ESIG
2:10 pm	*Resource Adequacy: How did we get here? And where are we going?* Dr. Michael Milligan, Consultant/GridLab Expert, formerly NREL Why we do it, what can contribute, how do wind and solar contribute, what models we use, what metrics we use, how did we get to where we are today? Brief Q&A
2:55 pm	*Redefining Resource Adequacy for Modern Power Systems* Derek Stenclik, Founding Partner, Telos Energy How resource adequacy methods and metrics should evolve with a changing resource mix and decarbonization. What are first principles and best practices for modeling reliability, and how to right-size mitigations to fit the reliability needs. Brief Q&A [We will take a 5-minute break during this slot]
4 pm	*Resource Adequacy – A Real World Example in a High Renewable Energy Future* Keith Parks, Senior Market Operations Analyst, Xcel Energy How resource adequacy is analyzed today including resources such as wind, solar, demand response, storage, transmission Brief Q&A
4:30pm	Breakout rooms with each speaker for detailed Q&A and discussion
5 pm	Adjourn

May 20, 2021 **System Balancing – Flexibility and Systems Integration**

2 pm ET *Introduction and orientation to training sessions*
Dr. Debra Lew, ESIG

2:10 pm *System Operations and the Need for Flexibility*
Dr. Debra Lew, Associate Director, ESIG
Unit commitment and dispatch, essential reliability services, flexibility supply curve
5-minute Q&A

2:50 pm *Future System Operations with an evolving grid*
Dr. Aidan Tuohy, Program Manager, Electric Power Research Institute
Risk-based operations, advanced operational simulation tools, visibility and controls for aggregated DERs, hybrids, hydrogen, gas-electric interface, stability limits
5-minute Q&A

3:35 pm 5-minute break

3:40 pm *Daily Portfolio Management at SMUD*
Jon Olson, Director of Energy Trading and Contracts, Sacramento Municipal Utility District (SMUD)
System operations with high levels of utility-scale and distributed solar, Energy Imbalance Market
5-minute Q&A

4:05 pm *The Changing Needs of System Operations: MISO's Perspective*
Marc Keyser, Regional Director, Customer Affairs — Central Region, Midcontinent Independent System Operator (MISO)
System operations with high levels of wind, ramping reserve product, forecasting

4:30pm 5-minute Q&A
Breakout rooms with each speaker for detailed Q&A and discussion

5 pm Adjourn

June 10, 2021 **System Stability**

2 pm ET *Introduction and orientation to training sessions*
Dr. Debra Lew, ESIG

2:10 pm *Foundational Basics on stability*
Jason MacDowell, Senior Technical Director, GE Energy Consulting
How do we keep the grid stable and how does it recover following loss of a power plant or transmission line? Basics on voltage, frequency, real and reactive power. Why do wind, PV and batteries impact stability differently from conventional generators?
Brief Q&A

2:55 pm *The Future of Stability with High Levels of Wind, Solar and Batteries*
Nick Miller, HickoryLedge
How does the evolving resource mix affect different types of stability? Grid-forming inverters, synchronous condensers and other options for stability
Brief Q&A
[We will take a 5-minute break during this slot]

4 pm *System Operator Example of Stability with High Penetrations of Wind and Solar*
Dr. Julia Matevosyan, Lead Planning Engineer, ERCOT
ERCOT experiences with low inertia and weak grids; mitigation options – technologies, operating practices, modeling
Brief Q&A

4:30pm Breakout rooms with each speaker for detailed Q&A and discussion

5 pm Adjourn

June 22, 2021 **Impacts of Distributed Energy Resources on the Bulk Power System**

2 pm ET	*Introduction and orientation to training sessions* Dr. Debra Lew, ESIG
2:10 pm	*Impacts of DERs on bulk power system reliability* Dr. Ryan Quint, Senior Manager of Bulk Power System Security and Grid Transformation, NERC Lessons learned from the NERC System Planning Impacts from Distributed Energy Resources Working Group (SPIDERWG) Brief Q&A
2:40 pm	*Interconnection of DERs (IEEE 1547-2018)* Dr. Jose Cordova, Engineer, EPRI Why the IEEE 1547-2018 standard is critical to bulk power system reliability and what are the steps to adopting it? Brief Q&A
3:10 pm	*Behind-the-Meter Solar Impact to Demand and Operations* Amber Motley, Senior Manager, Short Term Forecasting, CAISO How do system operators incorporate DERs into their real-time forecasts? Brief Q&A
3:25 pm	5-minute break
3:30 pm	*Example of flexible programs to accommodate multiple DER types* Sam Whelan, Manager of Power Supply, Holy Cross Energy DER programs including electric vehicles, batteries, peak time rebates Brief Q&A
3:50 pm	*Example of DER participation in NYISO* Michael DeSocio, Director of Market Design, NYISO DER participation in NYISO markets Brief Q&A
4:10 pm	*Lessons Learned on DER Integration* Obadiah Bartholomy, Manager of Distributed Energy Strategy, SMUD Brief Q&A
4:30pm	Breakout rooms with each speaker for detailed Q&A and discussion
5 pm	Adjourn