Training on Integrated Distribution System Planning for Midwest/MISO Region
October 13-15, 2020

Resources for More Information

Distribution components, systems and operations
- California Institute for Energy and Environment, Distribution System Voltage Management and Optimization for Integration of Renewables and Electric Vehicles – Status and State of the Art
- EPRI video

Integration, management and control of distributed energy resources (DERs)
- NREL, IEEE 1547-2018 Resources
- NARUC, Adoption of IEEE 1547-2018 and Interconnection Procedures, 2020
- NREL, High-Penetration PV Integration Handbook for Distribution Engineers, 2016
- NREL, Sequential Mitigation Solutions to Enable Distributed PV Grid Integration
- NREL, New Approaches to Distributed PV Interconnection: Implementing Considerations for Addressing Emerging Issues
- DOE, Revised IEEE 1547-2018 Standard Will Aid Solar Integration, 2019
- NERC, Reliability Guideline: Bulk Power System Reliability Perspectives on the Adoption of IEEE 1547-2018, 2020
- U.S. Department of Energy, Grid-Interactive Efficient Buildings website
- Better Buildings Alliance Renewables Integration Team

Transmission/distribution operational coordination
- P. De Martini et al., Operational Coordination Across Bulk Power, Distribution and Customer Systems, 2019
• JD Taft, *Architectural Basis for Highly Distributed Transactive Power Grids: Frameworks, Networks*, and Grid Codes, 2016

**Cybersecurity**
• National Institute of Standards and Technology, *Framework for Improving Critical Infrastructure Cybersecurity*, 2018

**Distribution system planning components**
• U.S. Department of Energy’s *Modern Distribution Grid* guides
• Alan Cooke, Juliet Homer and Lisa Schwartz, *Distribution System Planning – State Examples by Topic*, Pacific Northwest National Laboratory and Lawrence Berkeley National Laboratory (Berkeley Lab), 2018
• Hawaiian Electric Integrated Grid Planning website

**Emerging distribution planning analyses**

**Forecasting loads with DERs**
• Pacific Gas & Electric. 2015. *Distribution Resources Plan*
Hosting capacity and interconnection

- National Renewable Energy Laboratory, *Advanced Inverters (1547) capabilities, experiences, and interactions with hosting capacity*, 2019
- Smarter Grid Solutions, *Enhanced Hosting Capacity Analysis*, Prepared for Minnesota Department of Commerce, 2018
- California Distributed Resource Plan (R.14-08-013) Integration Capacity Analysis Working Group, *Final ICA WG Long Term Refinements Report*

Locational net benefits, non-wires analysis and DER sourcing

- California Public Utilities Commission, *Decision adopting Distribution Investment Deferral Framework*, Feb. 8, 2018
- Peak Load Management Alliance, “APS and EnergyHub for APS Distributed Energy Resource Aggregations,” June 4, 2020
- Wood Mackenzie, *US non-wires alternatives H1 2020: Battery storage seizes top spot as utilities’ preferred non-wires resource*, 2020

Integrated distribution resilience planning

- Hawaiian Electric *Resilience Working Group*

Grid modernization planning and investment economics

- U.S. Department of Energy's *Modern Distribution Grid* project
- California Public Utilities Commission, *Decision on Track 3 Policy Issues, Sub-Track 2* (Grid Modernization), March 22, 2018
- New Hampshire Public Utilities Commission, *Staff Recommendation on Grid Modernization*, Jan. 31, 2019

Distribution planning regulatory practices

- U.S. Department of Energy’s Modern Distribution Grid guides
• Alan Cooke, Juliet Homer and Lisa Schwartz, *Distribution System Planning – State Examples by Topic*, Pacific Northwest National Laboratory and Berkeley Lab, 2018


• Berkeley Lab’s *Future Electric Utility Regulation reports*

• Berkeley Lab’s research on time- and locational-sensitive value of DERs


• Forthcoming from Berkeley Lab — email Lisa Schwartz to request a draft:

**Impacts of DERs on net loads and approaches for actively managing load shapes**


• Darghouth, N., G. Barbose, and A. Mills. *Implications of Rate Design for the Customer-Economics of Behind-the-Meter Storage*, 2019

• Satchwell, A., P. Cappers, and G. Barbose. *Current Developments in Retail Rate Design: Implications for Solar and Other Distributed Energy Resources*, 2019


• Potter, J., E. Stuart and P. Cappers. *Barriers and Opportunities to Broader Adoption of Integrated Demand Side Management at Electric Utilities: A Scoping Study*, 2018

• National Renewable Energy Laboratory, *End use load profiles*


**Demand flexibility as a utility system resource**


- Frick, N., T. Eckman and C. Goldman, *Time-varying value of electric energy efficiency*, 2017
- Frick, N., E. Wilson, et al., *End-Use Load Profiles of the U.S. Building Stock: Market Needs, Use Cases and Data Gaps; End-Use Load Profile Inventory*, 2019
- Frick, N. et al., *Methods to Incorporate Energy Efficiency in Electricity System Planning and Markets*, forthcoming
- Frick, N. et al., *Locational Value of Distributed Energy Resources*, forthcoming

**Planning for energy storage and microgrids**
- Y Xu, CC Liu, KP Schneider, FK Tuffner and DT Ton: *Microgrids for Service Restoration to Critical Load in a Resilient Distribution System*
- Schneider et al., *Preliminary Design Process for Networked Microgrids*
- M Armendariz et al., *Coordinated Microgrid Investment and Planning Processes Considering the System Operator*
- B Ward et al., *The Advanced Microgrid: Integration and Operability*
- PNNL energy storage site: [https://www.pnnl.gov/energy-storage](https://www.pnnl.gov/energy-storage)
- Storage resources from Berkeley Lab’s Electricity Markets and Policy Department: [https://emp.lbl.gov/publications?f%5Bsearch%5D=storage](https://emp.lbl.gov/publications?f%5Bsearch%5D=storage)
- Synapse, *A Solved Problem: Existing measures provide low-cost wind and solar integration*, 2015
- Gorman, W., A. Mills, M. Bolinger, R. Wiser, N. G. Singhal, E. Ela and E. O'Shaughnessy. “*Motivations and Options for Deploying Hybrid Generator-plus-Battery Projects within the Bulk Power System.*” *The Electricity Journal* 33, no. 5 (June 1, 2020): 106739

**Planning for electric vehicles and strategies for managing charging**
- National Renewable Energy Laboratory electric vehicle load profiles: [https://afdc.energy.gov/ev-pro-lite](https://afdc.energy.gov/ev-pro-lite)
- U.S. Department of Energy Alternative Fuels Data Center: [https://afdc.energy.gov/fuels/electricity.html](https://afdc.energy.gov/fuels/electricity.html)
- California Public Utilities Commission, Zero Emission Vehicles, [https://www.cpuc.ca.gov/zev/](https://www.cpuc.ca.gov/zev/)