OPTIMIZING THE INTERCONNECTION PROCESS FOR RENEWABLES & STORAGE
A National Forum for Addressing Process and Technical Issues

July 30 – 31, 2018
PECO Energy Hall
Philadelphia, PA

POST-CONFERENCE WORKSHOP
Hosting Capacity Analysis – A Key Tool for Streamlining Distribution Interconnection
TUESDAY, JULY 31, 2018

“Really well-run conference with great variety of experts who are engaging and well versed on topic. Great way to meet professionals in your field.”

Engineer, Lincoln Clean Energy, LLC

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SUPPORTING ORGANIZATION
Solarize PHILLY
by the Philadelphia Energy Authority
OVERVIEW

Renewable energy and new grid technologies – energy storage, microgrids, electric vehicles – are moving into mainstream use and being integrated to the grid. This new energy landscape is driving greater creativity and flexibility in the interconnection process, to pave the way for: greater contributions from alternative sources, new methods that will save customers time and money, faster interconnections, and grid reliability.

This conference will serve as a forum for all entities involved in the interconnection process to review process and technical issues for interconnecting renewable energy and new technologies to the electric grid, addressing both distribution and transmission projects. It will discuss the process for interconnection utilized by different entities across the country, identify technical requirements from start to finish, evaluate potential regulatory and policy directions, and evaluate how best to update the interconnection process to accommodate the evolving electricity grid. Sessions will feature the perspectives of project developers, vertically-integrated utilities, distribution and transmission utilities, balancing authorities and system operators to share their expertise and discuss best practices for optimizing the interconnection process.

LEARNING OUTCOMES

- Identify the latest interconnection regulatory changes and rule-makings in process on the state and FERC level
- Discuss how utilities are collaborating with city “solarize” programs to streamline the interconnection process for new residential solar customers
- Evaluate how new technologies and a changing grid create new technical and operational challenges for interconnection
- Examine interconnection processes of utilities in different regions of the country and how they are managing increasing volumes of interconnection applications
- Evaluate interconnection case studies across regional jurisdictions and project requirements re: generator interconnection for specific RTOs, ISOs, and PMAs
- Review PJM’s and MISO’s interconnection processes and challenges to incorporate distributed energy resources into wholesale markets as well as regional coordination initiatives with other RTOs/ISOs and non-RTO jurisdictions
- Assess specific challenges for interconnecting grid-scale wind, solar and battery projects
- Assess specific challenges for interconnecting Distributed Energy Resources (DERs)
  - Solar photovoltaic (PV) installations
  - Battery storage technologies
  - Microgrids
  - Electric vehicles (EVs)
- Review the interconnection process from the perspective and experiences of:
  - Investor-owned utilities in regulated and retail markets
  - Renewable and storage project developers
  - Independent System Operators (ISOs), Regional Transmission Organizations (RTOs), and Power Marketing Administrations (PMAs)
- Identify advanced modeling tools and techniques utilized by utilities and transmission owners leading the way in distributed energy resource (DER) and storage interconnection
- Review key issues that cause delays in utility interconnection timelines, and solutions for expediting scheduling without sacrificing safety and reliability
- Review a value proposition analysis for projects from an interconnection standpoint

“All speakers were professional and the content was good. I was very impressed with the efficiency at which this conference flowed. The schedule and amenities were great. I also think the speakers were professional and the content was exactly what I signed up for”

Specialist Engineer, Tennessee Valley Authority (TVA)
AGENDA

MONDAY, JULY 30, 2018

7:45 – 8:15 am  Registration & Continental Breakfast

8:15 – 9:00 am  Keynote Address: PECO Energy – Making Connections in a Time of Change  
Tony Gay, Vice President – Governmental & External Affairs, PECO Energy

9:00 – 10:00 am  Interconnection to the Electric Grid: A Brief History on Policy/Regulation and FERC Update

• How did we get where we are today with the interconnection process and rules?
• Overview of the standard interconnection process and current related rulemakings
• Generator interconnection – what is the core guidance for interconnection, and why do we have that guidance?
• Commission-issued core guidance for interconnection:
  o Standard Large Generator Interconnection Procedures (LGIP) and Agreements (LGIA)
  o Standard Small Generator Interconnection Procedures (SGIP) and Agreements (SGIA)
• Background/history of FERC standard interconnection agreements and procedures for generators
  o FERC Order 2003
  o FERC Order 2006
  o Other notable rulemakings pertinent to interconnection
• Regional variations from the commission-issued interconnection procedures and agreements & RTO/ISO reforms
• Some current interconnection challenges and concerns
• Some recent interconnection-related developments
• December 2016 Interconnection NOPR RM17-8-000
  o Improving certainty for interconnection customers
  o Promoting more informed interconnection
• Recent FERC action on electric storage resources
  o November 2016 NOPR - participation model for electric storage resources
  o FERC energy storage order of Feb. 2018 – requirements for new grid operator rules on energy storage
  o Implications for storage interconnection
  o Implications for bulk/system support


10:00 – 10:15 am  Morning Break

“High quality of attendees and topics!”
Manager, Transmission & Interconnection, 8minutenergy

“Understanding both utility and developer perspectives helps tremendously with understanding the gravity and responsibility of my role as an interconnection engineer”
Senior Engineer, Salt River Project

“Conference was very informative. It is encouraging to hear from others in the industry and their views for addressing DER challenges and solutions.”
Senior Product Manager, Alliant Energy

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MONDAY, JULY 30, 2018 (CONTINUED)

10:15 – 11:30 am  “Solarize Philly” – Collaborating for a Renewable Future Through Utility Interconnection
Preparedness
Philadelphia Energy Authority’s “Solarize Philly” campaign is a city-wide program to help all Philadelphians go solar at home. The program has been wildly successful – with thousands signing up, and hundreds of contracts in place for residential solar, it is now one of the largest solarize programs in the country. This session will give an overview of the program initiatives, highlighting how collaboration with the local utility (PECO Energy) and key organizations proved crucial to the program's success.

- Overview of “Solarize Philly”
  - Number of contracts currently in place
  - Future phases of program and anticipated contract volumes
  - Job creation, training and support offered through the program
  - Special financing options for low and moderate-income households
  - Key partnerships
- PECO Energy's role
  - Designing a successful partnership to support for Solarize Philly
  - Supporting new solar interconnections
  - Cooperation with data sharing
- Ensuring successful permitting — collaborating with the Dept of License and Inspections

Emily Schapira, Executive Director, Philadelphia Energy Authority
Brian Barr, Manager – Distributed Energy Group, PECO Energy
Joe Kiss, Owner, KISS Electric

11:30 am – 12:15 pm MISO Update & Regional RTO/ISO Coordination for Interconnection
This session will provide insights and updates regarding multiple initiatives and developments relevant to the Midcontinent Independent System Operator’s (MISO) interconnection process, discussing:

- What projects are in MISO’s queues today?
- Percentages of specific technologies currently in MISO’s queues
  - Transmission—project types and their percentages
  - Distribution — project types and their percentages
- Projection of future footprint of MISO’s interconnection queue - what will the distribution of renewable energy look like in the short- and long-term?
- How are ISOs, RTOs, and non-RTO jurisdictions coordinating with customers on the interconnection process?
  - Impacts to traditional interconnection process with regional overlap
  - Optimizing analysis and studies of effects to the system
- Update on MISO coordination with...
  - SPP
  - PJM
  - Non-RTO jurisdictional systems
- MISO’s 2017 Queue Reform – results and successes so far

Arash Ghodsian, Manager – Resource Interconnection, Midcontinent Independent System Operator (MISO)

12:15 – 1:15 pm Group Luncheon
1:15 – 2:15 pm  Challenges to Incorporate Distributed Energy Resources (DER) into Wholesale Markets
This session will discuss the process and requirements for generator and storage interconnection in the PJM Interconnection. The session will describe PJM's current process and reasons it is done this specific way. It will also describe current challenges within PJM's interconnection process that FERC and stakeholders are reviewing. Specifically, the session will describe:

• Queue policies, procedures, deadlines and requirements
• Making requests and applying for interconnection
• Required and optional studies and analyses
• Interconnection agreements for a generator
• Aggregation issues on distribution circuits
• Results of recent FERC technical conference
• Considerations for site location and available points of interconnection

David Egan, Manager – Interconnection Projects, PJM Interconnection

2:15 – 3:00 pm  Analyzing the Value Proposition for Projects Based on Interconnection
• Overview of value analysis model — how it relates to interconnection process from start to finish
• Financial metrics utilized
• Impact analysis and assessing project value proposition and projected timeline
  o Pilot site analysis
  o Local impact analysis
  o Regional directives

David South, Senior Principal – Energy & Utilities, West Monroe Partners

3:00 – 3:15 pm  Afternoon Break

3:15 – 5:00 pm  Distributed Energy Resource Interconnection & Operations: PV, Storage, Microgrids, Electric Vehicles
• What renewable and technology projects are trending in the distribution queue?
• Best management practices for DER interconnection and grid integration
• Optimizing technical studies for resource interconnection to the distribution grid
• Update on smart Inverters/IEEE revisions 1547 – impacts to the interconnection process
• Inverter considerations
  o Communication and control
  o Low voltage ride-through
  o Short circuit duty contribution and ground grid impacts from clusters of inverter projects
• PECO's microgrid — update on development and lessons learned so far
• Evaluation for interconnecting specific distributed technologies:
  o Solar PV
  o Storage
  o Microgrids
  o Electric vehicles (EVs)
• Storage
  o Interactions between net metering and storage systems
  o Compensation for providing ancillary services
  o Discuss non-exporting systems

Nathan Smith, Senior Project Manager – Grid Contracts Origination & Operations, Southern California Edison
George Sey, DER Interconnection Manager, PECO Energy
David Egan, Manager – Interconnection Projects, PJM Interconnection

5:00 – 6:00 pm  Networking Reception (Downtown Philadelphia –Location TBD)
TUESDAY, JULY 31, 2018

7:45 – 8:15 am  Continental Breakfast

8:15 – 9:45 am  Managing Increasing Volumes of Interconnection Applications: Customer Education, Organizational Development, & Forecasting

- Considerations for developing an “ideal” utility interconnection department
- Customer education and engagement on interconnection
  - Educating customers and vendors on interconnection requirements
  - Tools for working with customers and vendors to interconnect rooftop PV
  - Tools for working with vendors to interconnect community solar
  - Internal education to improve the interconnection process
- Forecasting application volumes in the interconnection queue — best practices and considerations

Brian Cuffle, Supervisor – Distribution Design, Ameren
James Mirable, Principle Engineer, Baltimore Gas & Electric
Candace Etzler, Manager – Interconnection Business Office, Baltimore Gas & Electric

9:45 – 10:00 am  Morning Break

10:00 – 10:45 am  Large Hybrid Interconnections — Interconnections for Renewable & Storage Projects of the Future
Currently, there are few utility projects that combine wind, solar, and/or energy storage resources. However, experts predict that these ‘hybrid’ projects will start to appear more and more, as their advantages — including flexible dispatching and load profiles, fuller use of transmission, and cost-competitiveness — are being realized in the industry. This session will evaluate the future of hybrid renewable projects and discuss implications for the interconnection process, addressing:
- What are hybrid projects?
- What types of hybrid projects are in development, or projected to be in the near future?
  - Large wind and solar paired with battery storage
  - Hybrid projects on the distribution grid
- How are hybrid projects currently managed in the interconnection process?
- How should the interconnection process evolve to accommodate new technologies and pairing of technologies?

Ravi Bantu, Director – Transmission Americas, RES Americas

10:45 – 11:45 am  Closing Session: Building Innovation and Flexibility into the Interconnection Process

- Addressing problems and removing barriers in the renewable interconnection process
- Grid design and operational improvements for more efficient penetration of renewable energy
- Smarter ways to provide grid connections for renewable and storage project developers
- Regulatory and policy updates that would better enable clean energy integration
- Interconnection issues around monitoring of base services so customer can be compensated
- New technologies to help integrate renewables
- Changes and updates to current practices that would enable:
  - Schedule certainty
  - Cost certainty
  - Considerations for overall system reliability planning
- Conference recap and moving forward
  - What can participants walk away with from this conference in terms of what works and what needs to change across the regions’ interconnection processes?
  - What should be the top three action items for FERC and/or common to all regions?
  - What are the most important items in vertically-integrated, state regulated contexts?
  - What are the most important items in competitive market contexts?

Laura Hatfield, Contract Manager – Transmission Policy & Contracts Representative, Puget Sound Energy
POST-CONFERENCE WORKSHOP
Hosting Capacity Analysis – A Key Tool for Streamlining Distribution Interconnection

TUESDAY, JULY 31, 2018

12:30 – 1:00 pm  Registration
1:00 – 4:30 pm  Workshop Timing

OVERVIEW

“Hosting Capacity Analysis” (HCA) is an analytical tool that helps utilities, regulators and providers evaluate the best locations for distributed energy resources (DERs) to be added to the grid, and determine what they are worth at each location. HCA can be used as an interconnection screen and to steer optimal development of DERs on the distribution system. It is increasingly being recognized by distribution planners as a key technique for streamlining the DER interconnection process, and to better inform customers along the way.

Many utilities wanting to implement HCA tools may not know where to start, or fully understand what HCA is and its proper applications and current limitations. This workshop will walk attendees through basics of HCA, through the more advanced stages and considerations of how to properly use HCA alongside Heat Maps to optimize the placement and manage operation of DERs on the distribution system.

LEARNING OUTCOMES

• Discuss and define basic goals and uses of “Hosting Capacity Analysis” (HCA)
• Examine how HCA can be an important tool for optimizing interconnection and integration of DERs
• Review best implementation methods of HCA, current applications and limitations
• Identify how HCA can be used in conjunction with Heat Maps

WORKSHOP AGENDA

I. Hosting Capacity Analysis (HCA) – Overview and Define
II. Management of distributed energy resources (DERs)
   a. How DERs affect the entire electric system
   b. Criteria for DER interconnection
III. How HCA Fits in With:
   a. Distribution system planning (short and long-term)
   b. Location choice of DERs
   c. Managing load and growth on the distribution grid
IV. How HCA can Improve Interconnection and Integration of DERs
   a. Improve back-log of interconnection requests and system studies
   b. Provide better information for customers = better customer relationships
V. Key Goals of Implementing HCA for Distribution System Analysis
   a. Identifying how many DERs can be added to any interconnection point on the system
   b. Determining where DERs can cost-effectively serve the system
   c. Identifying best sites for future development of DERs
   d. Obtaining locational views

VI. Finding the Right Method for HCA on a Particular System
   a. Determining the difficulty of actually doing a HCA
   b. Developing proper analytical tools for your system

VII. Hosting Capacity Maps (HCM)
   a. Overview of HCMs
   b. Determining the values in HCMs
   c. What violations are looked at when creating a HCMs
   d. Utilizing heat maps in conjunction with HCMs

VIII. Using Heat Maps in Conjunction with HCA
   a. Identifying areas of pending and installed generation
   b. Working around congested areas

IX. Hosting Capacity Results Analysis
   a. How small changes in setting up feeders can dramatically change results
   b. Other considerations besides feeder hosting capacity

X. Visibility and Control of DERs – Best Practices
   a. Methods to increase hosting capacity on distribution feeders

WORKSHOP INSTRUCTORS

Steve Steffel
Manager, Regional Capacity Planning – Distributed Energy Resources, Pepco Holdings Company
Steve has been working with PHI since 1984 in various positions in Engineering Standards, System Operations, Substation Switchman Training, Transmission and Distribution Planning, and Distributed Energy Resources Planning and Analytics. The focus in DERP&A has been to analyze and plan for the interconnection of various types of distributed generation on the distribution grid, develop and maintain criteria, deploy new electric system modeling tools, prepare and present papers and presentations on the impact of PV on the grid and work with Public Service Commission personnel, the Regional Transmission Operator, and public officials and industry professionals. In addition, efforts have also focused on collaboration with industry partners and the DOE in finding new solutions for hosting renewables.

Dave Wilson
Electrical Engineer, Pepco Holdings Company
Dave Wilson is an Electrical Engineer with Pepco Holdings, a subsidiary of Exelon, based in Washington, D.C. He is passionate about the role that utilities must play in modernizing the grid and improving the process to interconnect new electrical generation sources. He is especially interested in applications of data analytics as a driver for new interconnections and managing the grid. He works in the Distributed Energy Resources Planning and Analytics department, and focuses on network applications within the Washington, D.C. region. In addition, he supports general analytics and data management for the entire PHI region which includes Maryland, Delaware, and New Jersey. Originally from Ohio, Mr. Wilson received a bachelor’s degree in Electrical Engineering from The Ohio State University. He is also in the process of completing an MBA with a focus in data analytics from George Washington University. Today, he will be providing an overview of the PHI interconnection process and technical analyses, management and analysis of active and pending interconnections, and interactive mapping capabilities.
INSTRUCTIONAL METHODS

Case Studies, PowerPoint presentations and panel discussions will be used in program.

REQUIREMENTS FOR SUCCESSFUL COMPLETION

Participants must sign in/out each day and be in attendance for the entirety of the conference to be eligible for continuing education credit.

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EUCI is authorized by IACET to offer 1.0 CEUs for this conference and 0.4 CEUs for the workshop

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O POST-CONFERENCE WORKSHOP ONLY
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