

DIGITAL GRID INNOVATION CONFERENCE

January 14-15, 2019
Renaissance Westchester Hotel
White Plains, NY

PRE-CONFERENCE WORKSHOP

DER Implementation Challenges

MONDAY, JANUARY 14, 2019

POST-CONFERENCE WORKSHOP

Leveraging Artificial Intelligence and Machine Learning Technology without Big Data: *The Integration of Engineering and Data Science in the Utility Space*

WEDNESDAY, JANUARY 16, 2019

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OVERVIEW

Power grids across the country are moving from old systems of centralized power generating entities to complex multi-directional grids that include millions of diverse power sources. Renewables, microgrids, and even electric vehicles all demand that utilities adopt new ways of operating. This new reality of distributed generation brings challenges to utilities looking to provide reliable service on resilient grids. Fortunately, as generation becomes more distributed, new tools arise to help monitor supply, demand, and asset health. Internet of Things allows for second by second monitoring, while big data provides tools for targeted decision making that allows for more efficient operations. While solutions abound, implementation can be challenging due to the complexity of companies' internal structure and the grid itself.

EUCI's Digital Grid Transformation Conference provides an overview of the challenges utilities face in maintaining a reliable and resilient multi-directional grid. It is also a forum for analytics and operations professionals to engage in a direct dialog to understand what opportunities are being created by technological advances to improve operations and maintenance on grid infrastructure.

LEARNING OUTCOMES

- Review regulatory changes designed to facilitate grid modernization
- Leverage technology to manage an increasingly distributed grid
- Develop a collaborative relationship between customers and the grid
- Take a tour of NYPA's Innovation Center and Digital Hubs
- Discuss advanced metering infrastructure for more reliable distribution operations
- Diagnose complex asset health issues
- Integrate storage in a distributed generation system
- Assess the threat landscape for better grid security
- Harness value from grid-edge technology

WHO SHOULD ATTEND

Directors, Managers, Engineers overseeing:

- Distribution
- T&D
- DER Integration
- DER Engineers
- Technology Officers
- Operational Technology
- Asset Management
- System Intelligence
- System Protection
- Control Engineering
- Innovation
- Renewable Integration
- Storage
- Solar

AGENDA

MONDAY, JANUARY 14, 2019

12:00 pm**Registration****1:00 – 1:45 pm****Creating a Regulatory Environment that Facilitates Grid Modernization**

Utilities are constrained by regulatory frameworks in terms of what kind of business model they choose to operate under. Regulators must stay on top of changing grid structures and new technologies so that companies can adapt. This session will examine how regulations need to evolve in order to:

- Allow and encourage innovation in transmission and distribution infrastructure
- Provide tools for customers to manage their electricity costs
- Enhance power markets so they work more efficiently with increasingly distributed grid
- Mitigate bill increases for customers
- Work with power companies to create sustainable business models

Upendra Chivukula, Commissioner, New Jersey Board of Public Utilities

1:45 – 2:15 pm**Leveraging Technology to Manage an Increasingly Distributed Grid**

In maintaining reliable electricity delivery, utilities must manage multiple disparate trends that are shaping electric power systems. What challenges do utilities face in managing complex distributed systems? What digital tools enable this transformation? How are grid operators harnessing distributed resources to maintain reliability and resiliency?

- Evaluating challenges and opportunities created by growth in distributed energy resources
- Anticipating reliability problems that come from an increasingly severe weather
- Creating “pro-sumers” – consumers who can give back to the grid
- Capturing value and improving efficiencies through technological innovation
- Using analytics to providing visibility into cost, energy, and carbon savings

Damian Sciano, Director, Distributed Resource Integration, Con Edison

2:15 – 2:45 pm**Networking Break****2:45 – 3:15 pm****Enabling DER's: A Partnership Between Customer and Grid Function**

Customers load profiles are experiencing notable changes due to new services, customer choice, and proliferation of grid edge technologies. Electric utilities need to take a more proactive role in shaping the future net-load shapes in a way that provides benefits to the customers and the utility itself. Actions undertaken individually by Grid (transmission, distribution, grid modernization) and Customer functions can both impact customer satisfaction and the reliability of the grid. DERs – battery storage, backup generation, solar, microgrids, etc. – can be used for both grid (utility-side-of-the-meter) and customer (customer-side-of-the-meter) opportunities but have an impact on both functions no matter where they are installed. The Grid and Customer functions collaborate and integrate their efforts to better serve the customer while providing safe, affordable, reliable power. This presentation will cover the tools to perform DER cost-effectiveness, propensity, and geospatial analysis in order to build load profiles, create forecast, and develop planning scenarios.

Cat Wong, Manager of DER Engineering, Entergy Corporation

AGENDA

MONDAY, JANUARY 14, 2019 (CONTINUED)

3:15 – 5:00 pm

Tour of NYPA's Innovation Center and Digital Hubs

Learn about NYPA's 3 digital hubs, as well as the innovation center they've built out to encourage innovation and collaboration. NYPA is exploring new ways of working in the innovation zone, bringing together groups within the organization that benefit from collaboration and working in physical proximity with each other, like R&D, Strategy, Cybersecurity, and Data Analytics.

NYPA's 3 Digital Hubs:

- iSOC: Integrated Smart Operations Center
 - o iSOC uses predictive analytics software to forecast and prevent equipment failures and significant outages at NYPA's 16 power plants and more than 1,400 circuit miles of transmission lines.
- AGILe Lab
 - o Rapid technological changes in energy use, data, and generation have led NYPA to create an advanced laboratory facility to test, model, and create new solutions for energy systems.
- NYEM: New York Energy Manager
 - o NYPA's advanced, secure energy management center, headquartered in Albany. NYEM helps drive insights to improve building energy performance across nearly 20,000 state facilities, reduce environmental impact and lower energy bills. The data is accessible online through desktop and mobile devices, and consists of three formats: Monthly utility bills, building interval data, and deep submetering data at the appliance level.

Paul Tartaglia, Chief Technology and Innovation Officer, New York Power Authority

5:00 pm

Return to Hotel and End of Day One

TUESDAY, JANUARY 15, 2019

8:30 – 9:00 am

Continental Breakfast

9:00 – 10:00 am

Customer Engagement: Leveraging AMI as IoT for Distribution Operations Reliability

This session covers uses and the evolution of leveraging Service Delivery Point Sensors, also known as AMI Meters, for Distribution Operations reliability priorities. We will explore the line of thinking and applied operational uses of 'Smart Meter' data that results when the view of them extends beyond seeing them as mini cash registers to end-point sensors on an electric distribution network, or as IoT devices. The topic will be explored through the lens of specific use cases implemented at DTE Energy, the current set of use cases underway and the effect of doing so in the context of an OT/IT operating model.

Sample Cases:

- AMI-Driven Outage Metrics
- Quality of Power Indices
- AMI-Based Outage Detection & Response Optimization
- Individual Customer EEG through the Electrical Experience Index
- Power Quality Forensics:
 - o Circuit & Transformer Level Voltage Performance
 - o 1-Leg Dead Detector
 - o Faulty Meter Installation & Performance Surveillance
 - o Open Neutral Detector
 - o Pre-Flight Probable Load-Side Voltage Issue Assessment
 - o Grounding Risk Assessment

Gary Gauthier, IT Manager, Operational Technology, DTE Energy

AGENDA

TUESDAY, JANUARY 15, 2019 (CONTINUED)

10:00 – 11:00 am



How Duke Energy Uses Machine Learning/Artificial Intelligence for Complex Health Diagnostics
HRM is a machine learning/artificial intelligence enhanced analytics tool that does complex health diagnostics for High Voltage power equipment and the risk that they hold for the grid. It is used for monitoring the health of transmission assets and the risk that they present to the grid, and promises to change how the transmission grid is managed.

Nicole Kurant, Lead Engineer, Asset Management Systems Intelligence, Duke Energy

11:00 – 11:30 am

Networking Break

11:30 am – 12:30 pm

Modernization of Distribution System and Integration of Distributed Generation and Storage

San Diego Gas & Electric (SDG&E) conducted a pre-commercial demonstration to evaluate IEC 61850 architectures for substation protection and controls applications. The project involved development of a laboratory test bed for an IEC 61850 process bus-based substation protection system. Protection use cases, adhering to current SDG&E practices, were used to demonstrate the interoperability of IEC 61850-capable merging units and relays from multiple vendors for various protective functions. The project goals were to gain familiarity with the IEC 61850 standard, test and compare IEC 61850-based protection and control systems against existing SDG&E practices, and provide recommendations for possible commercial adoption of the standard to SDG&E stakeholders. The pre-commercial demonstration use cases included protection and controls using Sampled Values (SV), MMS, and GOOSE. This project was funded through the California Energy Commission's Electric Program Investment Charge (EPIC). Detailed work was presented in a comprehensive final report delivered to the California Public Utilities Commission.

Kirsten Petersen, System Protection & Control Engineer (SPACE) Engineer II, San Diego Gas & Electric

12:30 – 1:30 p.m

Group Luncheon

1:30 – 2:30 p.m

Grid Security: Assessing the Threat Landscape

Each digital upgrade introduces new risks. Distributed energy also creates new vulnerability as more generation assets join the grid that utilities don't own or control. What new areas are companies protecting from cyberattack in this increasingly complex environment?

Tobias Whitney, Technical Executive Cyber Security Program, EPRI

2:30 – 3:00 pm

Networking Break

3:00 – 4:00 pm

Harnessing Value from Grid-Edge Technologies

- What technological trends are informing investment in the electricity sector?
- What investment opportunities exist in the convergence of electrification, decentralization, and digitalization?
- How can utilities manage the cost of transitioning to new technologies so they are most cost effective?

Panelists:

Lara Pierpoint, Senior Fundamental Program Strategy Manager, Exelon

Mark Stinner, Vice President, Greentech Capital Advisors

Peter Flynn, Managing Partner, Executive Vice President, Bostonia Partners

4:00 pm

Conference Concludes

PRE-CONFERENCE WORKSHOP

DER Implementation Challenges

MONDAY, JANUARY 14, 2019

OVERVIEW

This workshop is intended for professionals who need to be brought up to speed on the evolution of utility enterprise software grid control systems and how the systems are evolving to meet today's challenges, especially with DER, as well as solutions that are evolving to address these challenges. It will provide a baseline level of knowledge in preparation for the conference.

Regulatory renewable energy goals, more economical solar PV distributed energy resources (DER), and rising utility rates, has resulted in a rapid growth in DER deployment creating new challenges for utilities. These challenges require new software systems and applications to meet the utility need to improve the efficiency and reliability of grid operations. This workshop will provide an overview of some of the challenges grid operators, especially distribution operators, are discovering as the penetration of DER increases on the grid. An overview of new utility business models around the potential of distribution transactive energy markets will also be discussed along with the regulatory challenges.

While these digital transformations bring new technologies and new security threats to critical utility infrastructure, they also provide new opportunities for greater cyber security. This workshop will also review some of the recent attacks and explore the latest techniques attackers used. It will also review what asset owners, operators and IT/OT professionals did or didn't do to protect their critical systems. Cyber threat incidences that will be discussed include both publicized events and non-publicized events where attacks were made on critical utility infrastructure software systems.

LEARNING OUTCOMES

- Discuss how deployment of DER is changing the requirements for electric grid operations
- Discuss how technology is evolving faster than regulatory policy
- Identify new risks and new opportunities for security and reliability from new technology
- Review what we can learn from past cyber attacks
- Identify how cyber attacks are evolving in sophistication

WORKSHOP AGENDA

MONDAY, JANUARY 14, 2019

8:30 – 9:00 am

Registration and Continental Breakfast

9:00 – 10:30 am

Technology Evolution: Responding to DER Operational Challenges and Future Requirements

- Evolution from SCADA to power applications to ADMS/DERMS
- DER challenges to distribution operations
- Smart inverter overview and DERMS evolution
- Overview of possible transactive energy operations

10:30 – 11:00 am

Networking Break

WORKSHOP AGENDA

MONDAY, JANUARY 14, 2019 (CONTINUED)

- 11:00 am – 12:00 pm** **Review of Recent Cyber Security Attacks**
- Attacker techniques and indicators of compromise
 - Defending critical networks
 - Leveraging digitalization for increased security

12:00 pm **Pre-Conference Workshop Concludes**

WORKSHOP INSTRUCTORS



John Barnick
Industry Solutions Executive, ABB

John Barnick has a B.S. and Masters in Electric Power Engineering and a Minor in Economics from Rensselaer Polytechnic Institute. He has over 40 years of experience in the electric power industry with ABB. He has held positions in engineering, testing, project management, consulting, marketing, sales, corporate strategy, sales management, and teaching graduate level power system courses. Mr. Barnick has held chapter positions in the IEEE Power & Energy Society and has served on various industry and regional technical committees. He has authored technical papers and made numerous presentations regarding the electric power industry. As ABB Network Control's Director of Business Development for North America where he is focused on electric power industry automation of T&D systems, including Market Operations, SCADA, GMS, EMS and Advanced Distribution Management Systems for Smart Grid automation initiatives.



Joe Doetzl
Cyber Security Practice Leader, Grid Automation, ABB

Joe Doetzl has more than 20 years of IT/OT and Cyber Security experience. In his current role, he has global responsibility for the Cyber Security of ABB's Grid Automation portfolio of products and solution delivery. ABB's Joe has created and led cyber security and compliance programs for multiple electric utilities. He has audited multiple North American utilities for compliance to the NERC CIP standards. He has been active in multiple regional and national forums dedicated to critical infrastructure protection, including:

- Critical Manufacturing Sector Coordinating Council
- FERC Order 706 Standards Drafting Team that created versions 2, 3, 4 and 5 of the NERC CIP standards.
- NERC Critical Infrastructure Protection Committee
- Southwest Power Pool Critical Infrastructure Protection Working Group
- North American Transmission Forum Security Practices Group

Joe specializes in the design and implementation of enterprise-wide Information Security and Compliance Programs. He has extensive knowledge and experience in network security architecture, firewall management systems, intrusion detection, securing industrial control systems, disaster recovery procedures, security event monitoring, incident response, vulnerability assessment, patch management and security awareness training. Joe is a Certified Information Systems Security Professional and has a Master of Science, Computer Science from the University of Colorado and a Bachelor of Science, Mathematics and Computer Science from Marquette University.

POST-CONFERENCE WORKSHOP

Leveraging Artificial Intelligence and Machine Learning Technology without Big Data: *The Integration of Engineering and Data Science in the Utility Space*

WEDNESDAY, JANUARY 16, 2019

OVERVIEW

Machine Learning / Artificial Intelligence (ML/AI) technology traditionally bring with them firm data requirements that are not easily met in reality. What are some potential target areas for ML/AI analytics to extend into the power utility that these requirements are making implementation unrealistic and what are some solutions to that. Many aspects of the Power Utility business have not traditionally tracked detailed quality data in a usable format, what they did store they have not stored effectively. This may have taken them out of the ML/AI game it seems. There are some solutions however to leveraging this technology in the absence of the quantity, quality, and consistency that is optimal. We will be trying to inspire participants to dive into those opportunities and brainstorm ways they could apply this technology in their area of the business.

LEARNING OUTCOMES

This workshop will consist of four breakout sessions where attendees will discuss how machine learning may be used to solve problems encountered during generation, transmission, distribution, and supply chain. Each group elects a scribe, and a presenter. They spend 90 minutes w/ breaks as needed identifying a topic to brainstorm under their subject. They are instructed to answer the following questions to accomplish the session.

- What is the problem you want to solve?
- What is the data situation? What's available and what's not? What's critical and what's not?
- What do you have today that you want to maintain/keep in the solution?
- What boundaries do you have for your solution?
- Is there a regulatory impact with your solution?

WORKSHOP AGENDA

WEDNESDAY, JANUARY 16, 2019

8:00 – 8:30 am	Workshop Registration & Continental Breakfast
8:30 – 9:00 am	Introduction Duke Energy’s HRM (Health & Risk Management) Program is a comprehensive analytics program that is introducing high powered analytics with both machine learning and physics/rule based engineering to transform how they manage transmission assets forever into the future so Duke can optimize resources, extend asset lifecycles, and minimize catastrophic failures. Nicole Kurant will present the workshop material as it would pertain to the HRM program to prep folks for the breakout session
9:00-10:30 am	Breakout Sessions: Attendees are separated into groups where they will address four topics <ul style="list-style-type: none">• ML / AI & Generation• ML / AI & Distribution• ML / AI & Transmission• ML / AI Total supply chain – Generation to Customer
10:30 – 11:00 am	Networking Break
11:00 am – 12:00 pm	Call Out: Each teams presenter will provide a summary of their idea / brainstorming effort for integration of ML/AI in that area of the utility without the benefit of near real time or big data.
12:00 pm	Workshop Concludes

WORKSHOP INSTRUCTOR



Nicole Kurant
Lead Engineer, Asset Management Systems Intelligence, Duke Energy

Nicole L. Kurant, has a Bachelors and Masters of Science in Electrical Engineering from Michigan State University. Nicole has worked in automotive, telecom, and finally power utilities through her 22 year career as an Electrical Engineer. The past 11 years she has been a Lead Engineer for Duke Energy, in the Transmission Engineering Asset Management organization working out of Lake Mary Florida. Nicole is leading the Duke Energy HRM: Health & Risk Management Program. Duke Energy’s HRM Program is a comprehensive analytics program that is introducing high powered analytics with both machine learning and physics/rule based engineering to transform how they manage transmission assets forever into the future so Duke can optimize resources, extend asset lifecycles, and minimize catastrophic failures.

INSTRUCTIONAL METHODS

Case studies, PowerPoint presentations, tour and panel discussion will be used in this program.

REQUIREMENTS FOR SUCCESSFUL COMPLETION

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

IACET CREDITS



EUCI has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET). In obtaining this accreditation, EUCI has demonstrated that it complies with the ANSI/IACET Standard which is recognized internationally as a standard of good practice. As a result of their Authorized Provider status, EUCI is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standard.

EUCI is authorized by IACET to offer 0.9 CEUs for the conference and 0.3 CEUs for each workshop.

REGISTER 3, SEND THE 4TH FREE

Any organization wishing to send multiple attendees to this event may send 1 FREE for every 3 delegates registered. Please note that all registrations must be made at the same time to qualify.

EVENT LOCATION

A room block has been reserved at the Renaissance Westchester Hotel, 80 West Red Oak Lane, West Harrison, NY, 10604, for the nights of January 13-15, 2019. Room rates are US \$139 plus applicable tax. Call **1-914-694-5400** for reservations and mention the EUCI event to get the group rate. The cutoff date to receive the group rate is December 23, 2018 but as there are a limited number of rooms available at this rate, the room block may close sooner. ***Please make your reservations early.***

PLEASE SELECT

- SPECIAL BUNDLE PRICE: DIGITAL GRID INNOVATION CONFERENCE AND BOTH WORKSHOPS:** JANUARY 14-16, 2019: US \$2195
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- I'm sorry I cannot attend, but please email me a link to the conference proceedings for US \$395



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How did you hear about this event? (direct e-mail, colleague, speaker(s), etc.)

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OR Enclosed is a check for \$ _____ to cover _____ registrations.

Substitutions & Cancellations

Your registration may be transferred to a member of your organization up to 24 hours in advance of the event. Cancellations must be received on or before December 14, 2018 in order to be refunded and will be subject to a US \$195.00 processing fee per registrant. No refunds will be made after this date. Cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI event. This credit will be good for six months from the cancellation date. In the event of non-attendance, all registration fees will be forfeited. In case of course cancellation, EUCI's liability is limited to refund of the event registration fee only. For more information regarding administrative policies, such as complaints and refunds, please contact us at (201) 871-0474