RENEWABLE ENERGY GRID OPERATIONS CONFERENCE: Integration, Forecasting, Modeling, Planning and Curtailment

September 11-12, 2017
AT&T Executive Education and Conference Center
Austin, TX

PRE-CONFERENCE WORKSHOP

Renewable Energy on the Grid: Assessing Variability and Optimizing Assets through Flexible Resources
MONDAY, SEPTEMBER 11, 2017

CASE STUDIES

Austin Energy
Sacramento Municipal Utility District (SMUD)
Georgia Power Company
California Independent System Operator (CAISO)
Electric Reliability Council of Texas (ERCOT)

SPONSOR

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

The energy industry is past the phase of simply studying the impact of renewables on the grid. It is now in the problem-solving and performance management phase. As North America transitions towards systems with more renewables, it becomes increasingly important to evaluate best practices of renewable integration and to identify techniques and resources that simultaneously improve the power quality of the grid in systems with escalating levels of renewable penetration.

This conference will evaluate the biggest challenges to renewable energy integration, and identify solutions and pathways that coordinate responses and overcome these challenges. Case studies from experts and industry professionals from around the country will share their experiences and lessons learned on renewable integration.

Case studies and presentations from utilities and system operators operating renewable grids:
- Austin Energy
- Sacramento Municipal Utility District (SMUD)
- Georgia Power Company
- California Independent System Operator (CAISO)
- Electric Reliability Council of Texas (ERCOT)

LEARNING OUTCOMES

- Analyze how increasing renewable penetration impacts grid operations
- Evaluate how higher renewable penetration may threaten power reliability, and under what scenarios
- Discuss operational “flexibility” needs as renewable energy penetration escalates
- Review flexible resources, technologies and techniques that support renewable integration
- Identify market features that facilitate favorable renewable integration
- Examine the role of meteorology and weather forecasting
- Assess renewable energy curtailment measures and methods to avoid it

WHO SHOULD ATTEND

Representative Organizations
- Utilities and load-serving entities (LSEs)
- Local distribution companies (LDCs)
- Independent power producers (IPPs)
- Merchant power ventures
- Renewable energy suppliers
- Distributed generation industry

Department areas
- Risk management and reliability planning
- Weather forecasting
- System operations, operations management and engineering
- Power trading
- Power supply analysis
- Generation bidding and scheduling
- Technology and innovation program management
- Generation, load and transmission planning
- Resource and long-range planning
- Infrastructure and transmission asset management
- Energy efficiency, demand response and DSM staff
MONDAY, SEPTEMBER 11, 2017

12:30 – 1:00 pm  Registration

1:00 – 1:05 pm  Overview and Welcome

1:05 – 2:00 pm  **Introduction: The Growing Role of Renewable Energy on the Grid**

This session will give a general introduction to the topic of renewable energy resources’ impacts on the electric grid, evaluating challenges and opportunities for the electric sector. Specifically, it will address:

- Renewable energy integration growth from a national and international perspective
  - Low, medium and high penetration scenarios
- Understanding intermittency impacts and operational needs with increasing renewable energy
  - Is renewable energy threatening power reliability?
- The role of power market structures to accommodate increased renewable penetration
- Power price impacts — causes of low and negative power prices
- Supporting resources being utilized and/or needed to manage renewable variability
  - Ancillary services
  - Flexibility products
  - Battery storage and other technologies
- International case studies of high renewable penetration environments
  - Ireland — EirGrid’s management of 65% wind generation on an island system
  - Australia’s AEMO experience — considerations for the cause of the September 2016 blackout
  - Germany/Denmark — managing high levels of renewable in-feed

*Mike Hogan, Senior Advisor, Regulatory Assistance Project (RAP)*

2:00 – 3:30 pm  **‘Soup to Nuts’ Meteorology for Renewable Energy Systems**

- The significance of atmospheric science in the transition to a renewable energy future — how the weather impacts renewable integration and operations
- Meteorology impacts to the system — transmission and generation
- Strategic and technical meteorology needs in renewable energy systems
  - Fundamental best practices
  - Using meteorology to build a better system from front to back
  - Forecasting and data analytics
  - Asset management in renewable systems
- Wind and solar resource assessment and forecasting
- Moving away from deterministic forecasting to probabilistic forecasting
- Bridging the gap between atmospheric science and utility industries

*Justin Sharp, Renewable Energy and Meteorology Consultant, Sharply Focused LLC*

3:30 – 3:45 pm  Afternoon Break

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MONDAY, SEPTEMBER 11, 2017 (CONTINUED)

3:45 – 4:30 pm  Transmission Planning Strategies Needed to Accommodate Renewable Grids
Recent record-breaking renewable energy penetrations in U.S. regions (SPP and CAISO) would have been impossible without aggressive transmission build-outs in recent years. This session will focus on the relationship between renewable energy and transmission, discussing the big challenges and essential role of transmission planning needed to prepare for and meet the challenge of a transforming generation mix, including:
• Transmission planning processes – changes needed to properly prepare for the changing grid
• Addressing future transmission constraints
• Evaluating state/regional cooperation opportunities for transmission strategies
• Inter-regional projects and transmission lines proposed and in development to accommodate renewables on the grid
• Overcoming barriers to enable a robust and flexible regional and inter-regional transmission infrastructure

  Michael Hagerty, Associate, Brattle Group

4:30 – 5:15 pm  Integrating Variable Energy Resources in the Western Interconnect
• Insights from major studies on options to improve flexibility
• Optimizing the mix of flexibility options
• Lessons from utility case studies
• Utility case studies of high renewable integration and lessons learned
  o Xcel Energy in a wind region
  o Arizona Public Service (APS) in a solar region
  o Storage projects

  Thomas Carr, Attorney/Economist, Western Interstate Energy Board (WIEB)

5:15 – 6:15 pm  Networking Reception

TUESDAY, SEPTEMBER 12, 2017

8:00 – 8:30 am  Continental Breakfast

8:30 – 9:15 am  The California and CAISO Experience
• Operational needs with increasing renewable energy
• Market features for renewable integration
• Regional Integration and what the CAISO is hoping to achieve with other balancing authorities

  James Price, Senior Advisor - Market Analysis & Development, Renewable Integration, CAISO

9:15 – 10:00 am  ERCOT's Story on Wind Integration
ERCOT, an interconnection system operating only in Texas – accommodates more wind resources than any other single state grid. This session will address ERCOT’s experience integrating wind energy from a grid scale operational perspective, discussing challenges such as frequency issues that emerged and how they are handled.

  Dan Woodfin, Senior Director – System Operations, ERCOT

10:00 – 10:15 am  Morning Break
TUESDAY, SEPTEMBER 12, 2017 (CONTINUED)

10:15 – 11:15 am  
**Austin Energy SHINES: Integrating Solar, Storage & Modern Technologies**  
In February 2016, Austin Energy was awarded $4.3 million from the U.S. Department of Energy to pilot a collection of projects intended to move the city closer to its goal of 55% renewable energy generation by 2025, and to lead the way in determining best utility practices for integrating renewable energy and energy storage on the grid at utility, commercial, and residential scales. Known as the Austin SHINES (Sustainable and Holistic Integration of Energy Storage and Solar PV) project, the utility’s pilot study is now working to develop a technology platform that enables solar power, energy storage, smart inverters, forecasting tools, market signals, and advanced communications in a single software optimization platform. The SHINES project also plans to link directly two utility-scale energy storage systems to the Austin Energy distribution system. This session will discuss the SHINES initiative and how it will help Austin Energy lead the way in improving utility methods of electricity generation, delivery and consumption.

*Andrea Tosi, Project Lead - Austin SHINES, Austin Energy*

11:15 am – 12:15 pm  
**Sacramento Municipal Utility District: High Penetration PV Initiative**  
The High Penetration PV Initiative (HiP-PV) is a partnership between Sacramento Municipal Utility District (SMUD) and Hawaiian Electric Companies (HECO) to monitor data, evaluate efforts to gain visibility and form new operating practices to account for impacts of high penetrations of distributed generation. This session will review the initiative, as well as other R&D SMUD is doing, related to the operation and management of solar on the grid, addressing:

- Impacts of demand side resources that are providing generation on the grid
- Need for new data, analytical capabilities and tools to better capture and understand distribution level impacts
- Developing and piloting new visualization and analytical tools to help planners and operators visually track and trend distributed generation systems and their impacts on the grid
- Assessment of forecast techniques utilized to manage PV solar on the grid
- Methods to mitigate the variability of high penetration of renewables on the grid while maintaining reliability
- Pre-configuring smart orders for optimization of specific locations for renewable generation installation
- SMUD’s partnership with EPRI on the SHINE program

*Elaine Sison-Lebrilla, Renewable Energy Program Manager, Sacramento Municipal Utility District (SMUD)*

12:15 – 1:15 pm  
**Group Luncheon**

1:15 – 2:15 pm  
**Georgia Power: Effectively Managing Distributed Solar**  
This session will examine how Georgia Power is holistically evaluating its system requirements in advance of the anticipated, higher penetration of renewable energy resources that will confront the utility in the next several years, considering:

- The design, implementation and management of renewable generation programs
- Alignment of regulated renewable program development initiatives with policy
- Strategic project development to get the ‘right’ results
  - Analyzing the right size of the portfolio
  - Getting the right people on board
  - Partnering with the right consultants
- Technology initiatives that include advanced distribution management systems (ADMS) and distribution management systems (DMS) functions in the distribution control center to efficiently manage outages, improve reliability and operations, and provide better information
AGENDA

TUESDAY, SEPTEMBER 12, 2017 (CONTINUED)

1:15 – 2:15 pm  Georgia Power: Effectively Managing Distributed Solar (continued)
   • Future Renewable Generation Integration: How will Georgia Power manage renewable growth from an operations perspective?
     o Appropriately pricing the needed load based on specific generator profiles
     o Procuring capacity outside of capacity needs
     o Minimizing pricing impacts to customers

   Robin Lanier, Distributed Generation Principal, Georgia Power Company

2:15 – 2:45 pm  The ERCOT Grid: Flexible Tools for Renewable Integration
   This session will review some features and characteristics of the ERCOT grid and the ERCOT markets that are contributing to flexibility in an era of high renewable penetration.
   • Development of a framework for wholesale market participation by distributed energy resources (DERs), including fast-acting demand response and storage
   • Retail dynamic pricing (enabled by millions of smart meters), direct load control via smart thermostats, and other economic demand response
   • Ancillary Services markets and continuing discussions over the integration of flexible, non-traditional resources

   Paul Wattles, Senior Analyst – Market Design & Development, ERCOT

2:45 – 3:00 pm  Afternoon Break

3:00 – 3:45 pm  Flexible Generation: Requirements, Future Calculations, Economics
   • Resources and products that aid in renewable integration
     o Ancillary services
     o Modern technologies
     o Flexibility/flexible ramping
     o Price responsive demand response
   • Power price impacts in high renewable penetration environments
   • Market and dispatch modeling in high renewable penetration environments
   • Calculating flexibility needs in renewable energy systems
   • Overview of the economics of flexible resources needed to balance variable energy resources
   • Case studies of renewable integration and determining flexibility requirements
     o Corpus Christi Wind Power
     o Hawaiian Electric (HECO) integration analysis
     o Other integration projects — Duke Energy, Northwestern Energy, Los Angeles Department of Water and Power (LADWP)
   • Integrating renewable resources and utility considerations for future scenario environments (e.g., state RPS)

   Gary Dorris, President, Ascend Analytics

3:45 – 5:00 pm  Closing Panel: Moving Forward with Best Practices for Planning and Operations
   The session panelists will discuss practical measures that have been instituted in both market and non-market contexts to facilitate “healthy” grid operations in the face of accelerating renewable energy penetration. They will also consider responses that may be desirable and/or required farther in the future to further buttress renewable integration.

   Moderator: Michael Hogan, Senior Advisor, Regulatory Assistance Project (RAP)
   Andrea Tosi, Project Lead - Austin SHINES, Austin Energy
   Elaine Sison-Lebrilla, Renewable Energy Program Manager, Sacramento Municipal Utility District (SMUD)
   Kenneth Ragsdale, Principal – Market Design & Development, ERCOT

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PRE-CONFERENCE WORKSHOP

Renewable Energy on the Grid: Assessing Variability and Optimizing Assets through Flexible Resources

MONDAY, SEPTEMBER 11, 2017

8:00 – 8:30 am Registration and Continental Breakfast
8:30 – 11:45 am Workshop Timing

OVERVIEW

This workshop will evaluate how renewable energy resources impact the grid operationally — in low, medium and high penetration scenarios — and flexibility needs for the grid in each of these scenarios. Attendees will be guided on analytical methods to calculate the value of flexibility requirements associated with specific renewable penetration scenarios in the near and long term, while considering regional specific situations and their corresponding renewable portfolio standards (RPS).

LEARNING OUTCOMES

• Identify basic terms, conditions, and general requirements of renewable penetration and flexible resources
• Determine needs for flexible resources and discuss the value of flexibility in the short and long-term
• Evaluate portfolio and grid impacts of low, medium, and high renewable penetration scenarios
• Review hedging techniques and other strategies to manage variability, uncertainty, and flexibility in power grids

AGENDA

I. Assess Portfolio Effects of Renewable Energy Resources
   a. Renewable energy on the grid – operational impacts
      i. Low, medium and high renewable energy penetration scenarios
   b. Needs for flexible resources in the short and long term
   c. Economic construct for resource selection
   d. Central impacts to resource planning
      i. Optimal expansion planning
      ii. Balance of costs and risks
   e. Changing market dynamics and price volatility

II. Review Flexible Resources and Identify Basic Terms and Conditions
   a. Technologies
      i. battery storage
   b. Demand response
   c. Natural gas

III. Calculate the Value of Flexibility Resources and Needs
   a. Future scenarios — renewable portfolio standards (RPS)
   b. Low, medium and high penetration scenarios

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IV. Strategies and Techniques to Manage Variability and Flexibility in Power Grids
   a. Tools and hedging to incorporate uncertainty
   b. Common planning risk metrics
   c. Optimal supply planning
   d. Solving for capacity expansion plans
   e. Ramp resources and physical opportunities for ramp delivery

WORKSHOP INSTRUCTORS

Gary Dorris  
President, Ascend Analytics

Gary Dorris, Ph.D., President, Ascend Analytics has been a thought leader in energy modeling and risk analysis for 18 years. He has led the development of over a dozen resource plans and pioneered new techniques for risk based resource planning and portfolio selection. Dr. Dorris has developed new techniques in risk management that integrate uncertainty around both the physical and financial aspects of a utilities portfolio. His analytic innovations have extended toward the development of over a dozen software applications used by over 50 energy companies. In 2001, Dr. Dorris won distinguished recognition from the IPE for contributions to the field of energy risk management.

David Millar  
Director of Energy Analytics, Ascend Analytics

David Millar is Director of Energy Analytics at Ascend Analytics. He leads Ascend’s consulting practice, providing utility clients with expertise in risk-based long-term resource planning and valuation. Previously, David Millar worked at Pacific Gas and Electric, where he served as a Principal of Energy Modeling and Analysis. He led data analytics projects to guide company strategy on generation portfolio planning, energy storage valuation, and load and price forecasting. Mr. Millar previously worked in energy consulting with DNV GL and regulatory policy research at Lawrence Berkeley National Lab. He holds a master’s degree in Energy Economics and Policy from Duke University, and bachelor’s degrees in Earth Sciences and Political Science from the University of California, Santa Cruz.
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 program to be eligible for continuing education credits.

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 1.0 CEUs for the conference and 0.4 for the workshop.

EVENT LOCATION

A room block has been reserved at the AT&T Executive Education and Conference Center, 1900 University Ave, Austin, TX 78705, for the nights of September 10-11, 2017. Room rates are US $209 plus applicable tax. Call 1-512-404-1900 or click here for reservations and mention the EUCI event to get the group rate. The cutoff date to receive the group rate is August 29, 2017 but as there are a limited number of rooms available at this rate, the room block may close sooner. Please make your reservations early.

REGISTER 3, SEND THE 4TH FREE

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

SPONSORSHIP OPPORTUNITIES

Do you want to drive new business through this event’s powerful audience? Becoming a sponsor or exhibitor is an excellent opportunity to raise your profile before a manageably sized group of executives who make the key purchasing decisions for their businesses. There is a wide range of sponsorship opportunities available that can be customized to fit your budget and marketing objectives, including: Platinum, gold, or VIP sponsor, Reception host, Networking break host, Tabletop exhibit, Workshop sponsor, Lanyard sponsor, Luncheon host and Breakfast host.

Please contact Maggie Field at mfield@euci.com or 720-988-1250 for more information.
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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 August 11, 2017 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 our offices at 303-770-8800. EUCI reserves the right to alter this program without prior notice.