

FLEXIBLE GENERATION FOR POWER PLANTS

Training and Technology with a Focus on Battery Storage

October 17 - 18, 2017

EUCI Office Building Conference Center

4601 DTC Blvd

Denver, CO



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OVERVIEW

Thermal plant operators are increasingly looking for ways to address the grid's demand for flexible power generation. The increased adoption of cost effective variable energy sources, such as wind or solar power, is changing the way thermal plants operators are dispatched to fill in gaps in the supply of electricity. Often, plants that were built for base loading or peak only needs, are now used for load following, frequency response and regulation, and/or late afternoon rapid ramping needs, placing higher value on flexibility and responsiveness, rather than energy production, as in the past.

Fortunately, manufacturers of these power plants are providing new options and upgrades to maintain the relevancy of these vital assets and unlock the reliability value in existing facilities, enabling them to run more efficiently during changes in the energy supply as part of our switch to variable renewable energy sources. One innovation is a hybrid plant that combines the high capacity energy generation from natural gas combined with the immediate responsiveness of battery storage technology. The hybrid plant, operated by Southern California Edison utilizes battery storage to lower costs associated with frequent starts, fast ramping and always ready responsiveness to the gas turbines. More efficient operation in the spinning reserve operation of the facility allows other, more efficient or renewable generation resources, on the grid to provide electricity to consumers more economically. The Flexible Generation for Power Plants Summit features a case study on the technology and business case behind SCE's Center and Grapeland Peaker Plants.

As technology creates new demands and methods for operating power generation plants, it is critical to keep the crew trained. Properly training a crew to adapt to a volatile power generation environment is a powerful tool in maintaining resilient plant operations. In addition to creating a plant that effectively and resiliently responds to the demands of power generation, Flexible Generation for Power Plants offers a focus on preparing your crew to safely handle new battery storage technology.

Flexible Generation for Power Plants brings together experts on the opportunities, processes, and technological innovations involved with flexible generation. The training will showcase how battery storage can be incorporated into a fossil fuel plant to enable flexible power generation. There will be a focus on how to train staff for adaptability and safety. These presentations will be supported by case studies from Plant Managers from utility companies who can share their experiences in flexible power generation.

LEARNING OUTCOMES

- Discuss how to create value in existing peaker plants with battery storage technology
- Operationalize the costs of flexible generation
- Reduce minimum load on fossil fuel units so they can remain on line while producing less power
- Maintain plants better by assessing how hot, warm, and cold starts impact operations
- Assess the benefits of integrating battery storage into a natural gas plant
- Create an adaptable workforce who will be able to operate a power plant in unexpected ways
- Select battery technology that will reduce the pressure on your gas operations in handling peak and other flexible operations
- Develop guidelines to handle battery storage units safely
- Anticipate solutions to help your gas plant support increased grid reliance on renewable energy

WHO SHOULD ATTEND

- Plant Managers
- Maintenance Managers
- Engineering Managers
- Dispatch Operators
- Asset Managers
- Managers involved with power generation who oversee
 - Generation Strategy
 - Power System Integration
 - Energy Procurement
 - Energy Management
 - Energy Storage
 - Project Engineering

AGENDA

TUESDAY, OCTOBER 17, 2017

8:00 - 8:30 am Registration and Continental Breakfast

8:30 - 10:00 am What is Flexible Power Generation?

As more renewable power sources are integrated in the grid, the need for flexible power generation is becoming more and more critical. Flexible power plants, capable of load following to help close the gaps when the intermittent renewables are not available, provide the necessary reliability and availability to enable more renewable growth.

- How fossil fuel plants can be responsive of the demands of the market
- Utilizing peaking to cover fluctuations in wind or solar
- Opportunities for building peaking facilities in green fields and brownfields
- How does operating a traditional base loaded plant in cycling mode effect the O&M, plant life, and emissions profile of the plant?
- How do warm starts, hot starts and cold starts impact a coal or gas plant working to fill in electricity gaps?

Dalia El Tawy, Director, Siemens

10:00 - 10:30 am Networking Break

10:30 - 12:00 pm Safety Concerns when Using a Battery Storage Unit in a Hybrid Plant

- Installation standards and guidelines
- Standard Operating Procedures (SOP) development
- Hazard awareness and assessment
- First responder interaction
- Emergency response procedures
- Business continuity planning
- Battery system failure (BESS)
- Shock hazard awareness
- Fire control

Ronald Butler, CEO, ESSPI

12:00 - 1:00 pm Group Luncheon

1:00 - 2:30 pm Utility Case Study: Hybrid Natural Gas/Battery Storage Plant

The Hybrid Enhanced Gas Turbine System (Hybrid EGT) created by Southern California Edison in partnership with General Electric and Wellhead Power Solutions is now fully operational at the Center Peaker Plant in Norwalk and Grapeland Peaker in Rancho Cucamonga. The Hybrid EGT combines a battery’s ability to immediately respond to the grid’s needs with the flexibility of a quick-start, fast-ramping gas turbine. The new system unlocks tremendous value in existing peaker plants by making the Hybrid EGT instantaneously available, providing spinning reserves even while the gas turbine is offline.

- Identifying the need for flexible generation, the duck curve
- Reducing the number of times the gas turbine is started by half
- Lowering both operating costs and costs to energy consumers
- Reducing greenhouse gas and particulate emissions by as much as 60 percent
- Extending the life of plant equipment
- Assessing the benefits of integrating battery storage into a natural gas plant
- Review of various wholesale markets - value streams associated with increased operational flexibility
- Potential future applications for hybrid power plants

Vibhu Kaushik, Principal Manager, Asset Management & Generation Strategy, Southern California Edison

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AGENDA

TUESDAY, OCTOBER 17, 2017 (CONTINUED)

2:30 - 3:00 pm

Networking Break

3:00 - 4:30 pm

Unlocking System Value with Battery Hybrid Technology Electric Gas Turbines

GE's development of the world's first Hybrid Electric Gas Turbine was born from listening to owner-operators of our gas turbines and their requirements for meeting the emerging grid's operational needs

- Hybrid technology overview
- Increasing machine performance leads to energy market optimization & opportunities
- Optimizing the grid dispatch stack
 - o Vertically integrated utility, transmission system operators, load serving entities
 - o Merchant perspective - Capturing additional revenue and reducing maintenance costs
- Developing hybrid architecture for future proof deployments

Joe Heinzmann, Senior Product Manager, Battery Hybrid Electric Gas Turbines, GE Power Services

4:30 pm

Day One Adjourns

WEDNESDAY, OCTOBER 18, 2017

8:00 - 8:30 am

Continental Breakfast

8:30 - 10:00 am

Training Staff – Creating a Workforce that an Adapt to Changing Processes Found in Flexible Plant Generation

While operators, engineers, and tend have to focus on equipment performance when upgrading plants, reliability gains are often made by addressing the human component.

- Managing the dynamic environment of a flexible power generation plant
- Basics of resilience engineering and highly reliable organizing for variable power generation processes
- Approaching staff training in a manner that recognizes the inherent variability in power plant operations and how that increases with flexible generation
- Nine characteristics of highly reliable and resilient teams
- Practices and tools to increase staff adaptability when handling different tools and changing start-up operations

Elizabeth Lay, Resilience Engineering, Human Performance, Applied Resilience LLC

10:00 - 10:30 am

Networking Break

10:30 - 12:00 pm

Safety Concerns when Using a Battery Storage Unit in a Hybrid Plant

- Installation standards and guidelines
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- Emergency response procedures
- Business continuity planning
- Battery system failure (BESS)
- Shock hazard awareness
- Fire control

Ronald Butler, CEO, ESSPI

12:00 pm

Course Adjourns

INSTRUCTORS

Dalia El Tawy

Director, Siemens

Dalia El Tawy is the Director of Thermal Power Solutions at the Distributed Energy Systems Center of Competence in Siemens based out of Orlando, Florida. She is responsible for leading the development of Siemens' portfolio of thermal power solutions for the distributed energy market. DES thermal power solutions comprise and incorporate applications such as cogeneration, trigeneration, and prime/standby power utilizing Siemens leading technology portfolio of gas turbines, reciprocating engines, steam turbines, advanced control systems, energy storage, and electrical BOP into comprehensive solutions for DES customers tailored to key market verticals.

Dalia has more than 14 years of experience in the power generation and oil and gas markets.

Vibhu Kaushik

Principal Manager, Asset Management & Generation Strategy, Southern California Edison

As the Principal Manager of Asset Management and Generation Strategy group at SCE, Vibhu is responsible for driving the major maintenance and capital investment decisions and maximize the returns for company's hydroelectric, natural gas, and solar power plants; performance benchmarking & asset optimization, water planning, asset condition monitoring, engineering and risk analysis; plant engineering; central work management program; central outage planning and scheduling; documents and records management for all of SCE's generation assets.

Vibhu was previously Principal Manager for Resource Planning & Optimization where he managed supply and demand bidding strategies, overall utilization of SCE's contracted and utility owned generation portfolio (20,000 MW+) in California ISO markets through preparation of daily resource plans and quantifying the short-term risk of serving SCE's bundled customer load.

Prior to joining SCE in 2011, Vibhu was section head for generation operations planning group at Manitoba Hydro's system control center in Canada, where he lead the team responsible for generation reliability, generation modeling and optimal utilization, and outage management functions.

Joseph R Heinzmann

Senior Product Manager, OBattery Hybrid Electric Gas Turbine Systems, GE Power Services

Joe Heinzmann is the Senior Product Manager for General Electric's Power Services Business.

In this role, Joe is responsible for developing cost effective technical solutions for GE's customers around the world that maximizes the sustainability, economics and efficiency of our customer's and utilities energy systems.

Joe has led directly to the placement of large scale Battery Energy Storage Systems in various applications such as: Hybrid Electric Gas Turbines, Balancing areas , load management for Industrial customers, and renewable integration applications worldwide.

Joe holds a Mechanical Engineering Degree from the California Maritime Academy.

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INSTRUCTORS

Elizabeth Lay

Resilience Engineering, Human Performance, Applied Resilience LLC

An experienced leader who develops resilient, reliable organizations by redesigning how safety is created. Four years experience as Director of Human Performance at Calpine Corp – an owner / operator of 80+ electric utility power plants. Seven years experience as the leader of Siemens Energy Field Service Risk Management team. A Practitioner in Resilience Engineering & Highly Reliable Organizing communities for 10+ years. She is a mechanical engineer with graduate work in cognitive science. She has worked with companies such as NASA, ThyssenKrupp, Siemens, Calpine, and contributed to development of EU crisis management guidelines through the Darwin project.

Areas of Expertise Include: Resilience Engineering (RE), Highly Reliable Organizing (HRO), Safety 2, Human Performance (HP), Operational Risk Management

Ronald Butler

Chief Executive Officer, ESSPI

Ronald M. Butler holds a Master's degree in Instructional Systems Design from Wayne State. He has served as a consultant on numerous battery fire safety and training contracts (Ford Motor Co., Volkswagen, University of Michigan, etc.) and possesses 15+ years of training and organizational development experience. Ron's certifications include: Fire Inspector I (NFPA), Professional Continuity Practitioner (FEMA), Business Continuity Planner (NFPA 1600), Disaster Response and Recovery, Emergency Planning (State of Michigan), Pipeline Emergencies Response, Professional Emergency Manager Cert (State of Michigan), Emergency Exercise Planning (State of Michigan and FEMA), contract negotiations, hazardous materials (response and operations), evacuation planning (NFPA), radiological awareness, response and operations, rapid intervention, confined space (operations), marine firefighting (response and operations), Lithium-Ion battery fire response training for Aircraft Rescue Fire Fighting (ARFF), process design (battery fire response SOP's), and many more. Ron has active partnerships with NFPA and Underwriters Laboratories. He has designed, and delivers, battery/xEV safety and emergency response training for both organizations and assisted in the development of NFPA's Energy Storage Response training for first responders. Ron founded Energy Storage Safety Products International (ESSPI) which is involved in the design and development of next-generation fire suppression and containment systems for battery operations and logistics. He chairs the Michigan Aerospace Manufacturers Association's Battery Logistics Development Group which has defined a group of organizations that seek to develop solutions for the safe shipment and storage of battery tech.

SPONSORSHIP OPPORTUNITIES

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Please contact Dave Hoffman at dhoffman@euci.com or 720-642-9751 for more information.

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INSTRUCTIONAL METHODS

Case studies and power point presentations will be used at this symposium

REQUIREMENTS FOR SUCCESSFUL COMPLETION

Participants must sign in/out each day and be in attendance for a minimum of four hours to be eligible for any 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.

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4601 DTC Blvd, B-100
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NEARBY HOTELS

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7800 E. Tufts Ave
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Hilton Garden Inn Denver Tech Center

7675 E. Union Ave
Denver, CO 80237
Phone: 303-770-4200
0.6 miles away

Denver Marriott Tech Center

4900 S. Syracuse St
Denver, CO 80237
Phone: 303-779-1100
0.7 miles away

Hyatt Place Denver Tech Center

8300 E. Crescent Parkway
Greenwood Village, CO 80111
Phone: 303-804-0700
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REGISTRATION INFORMATION

EVENT LOCATION

Mail Directly To:

Electric Utility Consultants, Inc. (EUCI)
4601 DTC Blvd., Ste. 800, Denver, CO 80237
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WWW.EUCI.COM**p: 303-770-8800****f: 303-741-0849****EUCI Office Building Conference Center**

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FLEXIBLE GENERATION FOR POWER PLANTS SYMPOSIUM
OCTOBER 17 - 18, 2017: US \$1395

Early bird on or before September 29, 2017: US \$1195

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TO THE CONFERENCE PROCEEDINGS FOR US \$295

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EUCI's Energize Weekly e-mail newsletter compiles and reports on the latest news and trends in the energy industry.

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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 September 15, 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.

