GAS INSULATED SUBSTATIONS
Regulatory, Technical, and Business Considerations

February 26-27, 2020
Anaheim Marriott Suites
Anaheim, CA

Featuring Anaheim City Site Visits
Linxon Site Tour - Harbor Substation
Siemens Site Tour - Park Underground Substation
THURSDAY, FEBRUARY 27, 2020

PRE-CONFERENCE WORKSHOP
GIS 101: An Introduction
Best Practices and Considerations
WEDNESDAY, FEBRUARY 26, 2020

POST-CONFERENCE WORKSHOP
SF6, The Alternatives, & What It Means For Your Company’s Future
FRIDAY, FEBRUARY 28, 2020

CASE STUDIES
Anaheim Public Utilities
Austin Energy
Burns & McDonnell
PSEG
Siemens

HOST UTILITY
Anaheim Public Utilities

SPONSORS

EUCI is authorized by IACET to offer 0.8 CEUs for the conference and 0.4 CEUs for each workshop.
OVERVIEW

Faced with increasing demands for reliability, improved aesthetics and security, the adoption of gas insulated substations (GIS) by North American utilities is rapidly increasing. Companies also elect to use GIS because of the increased load and limited space present in the urban areas. Often, building new substations or increasing capacity is difficult because land is either not available or is prohibitively expensive. This conference will address regulatory, technical and business considerations for GIS.

Attendees will learn about Austin Energy’s new compact GIS substation as well as their complete controls upgrade in an operating GIS substation. PSEG’s GIS expert will discuss their portfolio expansion and cost lifecycle. The conference will review SF₆ characteristics, environmental standards, and emission reductions. A case study of Xcel Energy’s Denver 115-kV GIS installation will be included, as will lessons learned during GIS commissioning for Seattle City Light’s Denny substation.

Participants will have the opportunity to learn about GIS low to high voltage designs, applications and expansion. Experts will discuss alternative insulating fluids to SF₆ gas as well as PG&E’s SF₆-free GIS installment. Digital substations will be discussed, including benefits, design and technology. The City of Anaheim will provide case studies regarding three of their GIS substations.

This event will conclude with a tour of two of the City of Anaheim’s GIS substations, including its underground Park substation. Tour attendees must bring a hard hat, an FR shirt or clothing made of non-melting natural materials and closed toed shoes with no stiletto-type heels.

LEARNING OUTCOMES

- Discuss Austin Energy’s new compact GIS substation as well as their complete controls upgrade in an operating GIS substation
- Describe PSEG’s GIS portfolio expansion and cost lifecycle/justification
- Review SF₆ characteristics, environmental standards, and emission reductions
- Participate in a GIS hot topics Q&A panel
- Hear industry updates on other GIS projects from switchgear components to full medium to high voltage installations
- Describe the downtown Denver 115-kV GIS installation with Xcel Energy
- Explain lessons learned during GIS commissioning for Seattle City Light’s Denny Substation
- Review new GIS design ideas, applications and industry wide expansion
- Discuss alternative insulating fluids and design types to SF₆ gas
- Describe the SF₆-free GIS installation with PG&E
- Explain digital substations, including benefits, design and technology
- Review case studies regarding 3 of the City of Anaheim’s GIS substations
- Attend a tour of two City of Anaheim GIS substations including an underground, park installation

WHO SHOULD ATTEND

- Transmission and Distribution executives and managers
- Substation and distribution engineers
- Project managers involved in substation design, modification, and instillation
- Utility asset managers
- Construction firms involved in GIS projects
- Transmission and distribution planners
- Utility environmental managers
AGENDA

WEDNESDAY, FEBRUARY 26, 2020

12:30 – 1:00 pm  Registration

1:00 – 1:15 pm  Welcoming Remarks
  Harry Sidhu, Mayor, City of Anaheim

1:15 – 2:00 pm  Austin Energy Case Studies: New Compact GIS Substation in an Urban Downtown Area & Complete Controls Upgrade in an Operating GIS Substation
  Mr. Bayer will present two case studies of Austin Energy GIS projects. The first is a compact GIS substation in an urban downtown area serving underground network distribution. As this project is not complete, site constraints, design and community involvement will be discussed. The second is a complete control upgrade of an operating GIS substation performed by Austin Energy engineering and field crews. Failure of obsolete components of the existing control system compromised supervisory control which prompted this project. Innovative design, preparation and execution will be discussed.
  Scott Bayer, Director of Transmission and Substation Engineering & Construction, Austin Energy

2:00 – 2:45 pm  PSEG GIS Portfolio Expansion and Cost Lifecycle
  This case study will discuss key considerations Public Service Enterprise Group (PSE&G) has made to justify a rapidly expanding GIS portfolio. The presentation will cover the business case for installing new GISs, medium to high voltage designs, and new strategies PSEG has taken to implement.
  Raymond Alvarez, Sr. Director of Electric Asset Management, PSEG

2:45 – 3:00 pm  Afternoon Break

3:00 – 3:45 pm  Sustainable GIS Service & Environmental Practices: Preventing SF₆ Emissions Through Awareness
  This presentation will cover:
  • SF₆ characteristics overview
  • Current environmental standards
    o Local
    o Federal
  • Environmental benefits of reconditioned SF₆ gas
    o FAQ
  • Importance of training personnel conducting SF₆ breaker maintenance
    o EU vs US
  • How DILO is working with utilities to assist in their efforts in reducing emissions
    o DILO Direct services
    o DILO Direct-Track gas management program
    o Accredited education
  • Processes that all SF₆-users can adopt to do their part
  Chris Barrett, Regional Manager- U.S. West Coast Regions, DILO

3:45 – 5:15 pm  GIS Hot Topics Q&A Panel
  This panel presents an opportunity to pose your GIS questions to industry experts.
  Moderator: George Becker, Senior Substation Engineer, POWER Engineers
  Panelists:
  Thomas Schulz, Manager- North American Gas Insulated Substations, ABB
  Chris Barrett, Regional Manager- U.S. Midwest & West Coast Regions, DILO
  Raymond Alvarez, Sr. Director of Electric Asset Management, PSEG
  Scott Bayer, Director of Transmission and Substation Engineering & Construction, Austin Energy

5:30 – 6:30 pm  Networking Reception
### Agenda

**Thursday, February 27, 2020**

<table>
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<th>Time</th>
<th>Session</th>
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<tr>
<td>8:00 – 8:30 am</td>
<td>Registration</td>
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<tr>
<td>8:00 – 8:45 am</td>
<td>Downtown Denver 115-kV GIS Installation with Xcel Energy – Case Study</td>
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|               | A brief case study of challenges encountered during the installation of 115kV gas insulated switchgear in downtown Denver. This project greatly enhanced system reliability reconfiguring the station from a 115kV air insulated straight bus to a 115kV GIS ring. Congestion of below grade utilities, site access and lay down space in an energized yard will be discussed during this presentation.  
*Janson Ferrera, T&D Projects Manager, Burns & McDonnell* |
| 8:45 – 9:45 am | Denny Substation Commissioning: Lessons Learned                                           |
|               | This session will cover GIS lessons learned for the recently finished Denny substation, including issues discovered with the Denny substation during commissioning and how Seattle City Light is fixing those issues. The session will also cover the ongoing line reactor GIS project.  
*Rajinder Rai, Principal Substation Engineer, Seattle City Light* |
| 9:45 – 10:30 am | GIS Design, Application and Expansion                                                      |
|               | • GIS design  
• How utilities are applying GIS  
• GIS applications in various regions  
• Expansion of GIS  
*Patrick Abruzzese, GIS Product Line Manager, Mitsubishi Electric Power Products, Inc.* |
| 10:30 – 10:45 am | Networking Break                                                                           |
| 10:45 – 11:30 am | Alternative Insulating Fluids to SF₆ Gas - Status and Strategy Considerations            |
|               | SF₆ has been an essential dielectric fluid for Transmission and Distribution equipment and switchgear for decades. Despite of all the technical advantages of SF₆ there is one shortcoming, that being environmental impact. This presentation will provide an update on the status of ongoing research and development of potential new gases, gas mixtures and vacuum interrupter technologies, that have similar electrical properties and functionality to SF₆ filled equipment, but with much lower GWP. This presentation will also provide strategy considerations with respect to the development and use of SF₆ alternatives.  
*George Becker, Senior Substation Engineer, POWER Engineers* |
| 11:30 am – 12:15 pm | SF₆-Free GIS Installment with PG&E                                                        |
|               | This case study will focus on PG&E’s SF₆ case study: the business case and lessons learned.  
*Thomas Rak, Manager Substation and T-Line Standards, PG&E*  
*Gilles Barthes, Director of Sales, Marketing and Product Development, Siemens* |

*“It’s great to bring utilities and vendors together to discuss best practices and lessons learned.”*  
Project Manager, Alabama Power Company
12:15 – 1:00 pm  
**Group Luncheon**

1:00 – 1:45 pm  
**ABB GIS & Digital Substation**  
With the development of the grid and integration of renewable power sources like large windfarms, demands are rising for highly reliable Substation operation, planning of outages and assurance of asset health. This session will explain what a digital Substation is, address benefits, design and technology of the digital Substation concept including topics such as:  
- Digital Substation Applications, Benefits and Technology  
- Testing and maintenance of Digital Substation  
- Experience from utilities Digital Substation Implementation  

*Galina Antonova, Technical Sales Engineer—ABB, PGGA Group*

1:45 – 2:30 pm  
**Anaheim City Case Studies: Park, Harbor and Anaheim Substations**  
This presentation will discuss the City of Anaheim’s business case for GIS, and elements of the planning and approval process for a municipal entity. The session will cover the business drivers that lead to the design of the Park Substation, and the construction and aesthetic considerations of the newly-built Harbor and Anaheim Substation. GIS commissioning and public outreach will be addressed, along with lessons learned.  

*Larry Davis, Capital Projects Manager, Anaheim Public Utilities (APU)*  
*Joseph Wei, Substation and Automation Manager, Anaheim Public Utilities (APU)*  
*Janet Lonneker, Assistant General Manager- Electric Services, Anaheim Public Utilities (APU)*

2:30 – 5:30 pm  
**Anaheim City Site Visit**  
*Linxon Site Tour – Harbor Substation*  
*Siemens Site Tour – Park Underground Substation*  
Tour attendees must bring a hard hat, an FR shirt or clothing made of non-melting natural materials, and closed toe shoes with no stiletto-type heels.

5:30 pm  
**Conference Adjourns**

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**“A great exposure to the real life engineering and operations issues and considerations for GIS.”**  
Stations Engineering Manager, FPL

**“It was such a great conference with many interesting topics! I loved that all parts of the industry were there, from manufacturing to utility, to openly share their expertise. It was also the perfect size – not too big where it’s too overwhelming. Thanks for such a great conference!”**  
Project Manager, Hawaiian Electric

**“This helped me better understand the basics of GIS and helped to get me up to speed with industry developments.”**  
Engineer, Southern California Edison
PRE-CONFERENCE WORKSHOP

GIS 101: An Introduction
Best Practices and Considerations

WEDNESDAY, FEBRUARY 26, 2020

8:00 – 8:30 am  Registration & Continental Breakfast
8:30 am – 12:00 pm  Workshop Timing

OVERVIEW

This workshop will provide an overview of compact gas insulated substations (GIS) and compare GIS to traditional air insulated substations (AIS). Traditionally GIS substations were used only when real estate was extremely limited or real estate and/or site preparation was very expensive. The speakers will demonstrate comparable cost between AIS and GIS due to new pre-engineered, preassembled, & pretested solutions; substation physical security considerations; and total life cycle cost. We will conclude with a Q&A session to cover any remaining questions.

LEARNING OUTCOMES

• Describe fundamental characteristics of GIS
• Compare AIS to GIS
• Learn AIS & GIS total life cycle cost comparisons
• Compare substation physical security cost of AIS & GIS
• Understand “The Digital Substation”

WHO SHOULD ATTEND

• Transmission & distribution executives and managers
• Substation & distribution engineers
• Project managers involved in substation design, modification, and installation
• Utility asset managers
• Construction firms
• Transmission and distribution managers
• Utility environmental managers
• Anyone wanting to learn more about the basics of GIS
PRE-CONFERENCE WORKSHOP AGENDA

WEDNESDAY, FEBRUARY 26, 2020

8:00 – 8:30 am  Registration & Continental Breakfast

8:30 am – 12:00 pm  Workshop Timing

• Introduction & Overview
• Basics and Technology
• Interface Design
• O&M Design Advancements
• Development Trends
• “The Digital Substation” Communication & Condition Monitoring
• GIS Application – Optimized & Innovative Layouts
• Deployment of Pre-engineered GIS to Reduce Construction Time and Cost
• Cutover from AIS to GIS
• GIS and Digital Integration
• Substation Physical Security: Grid Hardening With GIS
• AIS/GIS Life Cycle Cost Comparison
• Q&A

PRE-CONFERENCE WORKSHOP INSTRUCTORS

Pravakar Samanta  
Engineering Director, Linxon  

Mr. Pravakar Samanta is the Engineering Director for Linxon North America, an ABB & SNC Lavalin Company  

He has received his B.S. in Electrical Engineering and Management. He is a senior member of IEEE and participated in various standards and the GIS handbook publication.

In his over 25 years of experience (more than 10 years in leadership management & 12 years international) in the industry, he held multiple roles – ranging from Application Engineering to Project Sales and Commercial Operation. His expertise includes sales, engineering, and business operation for Substation (AIS and GIS), Rail, Wind, Thermal and Nuclear Power and Oil Refinery projects. He managed multiple large projects for Transmission Utility, Rail, Oil and Process Industry that are diverse in both scope and customer base.

“I would recommend this conference to all new utilities/users who are not familiar with GIS “

Business Development Manager, Siemens
PRE-CONFERENCE WORKSHOP INSTRUCTORS

Pat Ervin  
**Business Development Manager, Linxon**

Mr. GL “Pat” Ervin is the Business Development Manager for Linxon North America, an ABB & SNC Lavalin Company. Linxon specializes in HV AC substations. His responsibility includes convincing utilities to convert from large traditional AIS substations to modern compact GIS substations. He has ten years of experience developing compact substations for Linxon & ABB and is a member of the IEEE PES GIS Substations Subcommittee. He has a Bachelor of Science General Studies degree from West Point.

Thomas Schulz  
**Manager, North American Gas Insulated Substations, ABB**

Thomas graduated with a Masters Degree in Electrical Engineering from HTWK in Leipzig/Germany in 1996 specializing in Power Technology. He has been with ABB since 1999. As a project manager for airport projects in Kazakhstan, Uzbekistan and Kyrgyzstan he was responsible for the project handling for airport specific facilities and control as well as the power supply transmission lines and high voltage substation equipment.

Today Thomas Schulz is the ABB GIS Manager for North America. In this function he is responsible for the marketing and sales of the GIS from conceptual design to all technical and commercial aspects of the GIS.

Galina S. Antonova  
**Technical Sales Engineer, ABB, PGGA Group**

Galina received her M. Sc. degree (1993) and a Ph.D. (1997) in Electrical Engineering and Data Communications from the State University of Telecommunications, St. Petersburg, Russia. She has over 20 years of experience in the area of electrical engineering, data communications and time synchronization, serving mainly electrical power industry. In her current role with ABB, Galina is applying her expertise to substation automation and protective relaying applications. She is also actively involved with IEEE PSRC and is a Canadian member of the IECTC57 WG10.

“Great mix of technical information & personal experience”

Electrical Engineer, SECO
POST-CONFERENCE WORKSHOP

SF₆, The Alternatives, & What It Means For Your Company’s Future

FRIDAY, FEBRUARY 28, 2020

8:00 – 8:30 am Registration and Continental Breakfast
8:30 am – 12:00 pm Workshop Timing

OVERVIEW

This workshop will provide vital knowledge in SF₆ handling, safety, environmental practices, and provide a general understanding of the alternative gas movement. We will begin by discussing SF₆ and why it’s used in the electric utility industry more than anywhere else in the world, as well as discuss the current local and federal environmental standards that existing within the US. There will be handling overviews of some of the most common and useful gas service equipment along with related safety methods that should be considered. After that, we will dive into alternative gas technologies and what we currently know vs what we do not and how that applies to you on a field level. Lastly, we’ll discuss the road ahead for SF₆ and what is taking place within the government.

LEARNING OUTCOMES

• Address characters of SF₆, including history, properties, and contaminants
• Explain current environmental standards at a local and federal level
• Describe hands-on SF₆ gas handling and safety methods
• Review SF₆ recovery, filling, and evacuation
• Evaluate mass monitoring, gas analyzing, and leak detection
• Describe SF₆ alternatives
• Discuss current phase-out options
• Explain long-term sustainability practices

WHO SHOULD ATTEND

• Transmission and Distribution executives and managers
• Substation and distribution engineers
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• Utility environmental managers
POST-CONFERENCE WORKSHOP AGENDA

FRIDAY, FEBRUARY 28, 2020

8:00 – 8:30 am  Registration & Continental Breakfast

8:30 am – 12:00 pm  Workshop Timing

- SF₆ Characteristics
  - History
  - Properties
  - Contaminants
- Current environmental standards
  - Local
  - Federal
- Hands-On SF₆ Gas Handling & Safety Methods
  - Recovery, Filling, & Evacuation
  - Mass monitoring
  - Gas analyzing
  - Leak detection
- What are the alternatives?
  - OEM involvement
  - Environmental impacts
  - The known versus the unknown
- Where does SF₆ go from here?
  - Current phase-out discussions
  - Long-term sustainability practices

POST-CONFERENCE WORKSHOP INSTRUCTOR

Chris Barrett
Regional Manager- U.S. West Coast Regions, DILO

Chris is a Regional Manager at DILO Company, Inc. and oversees all operations throughout the west coast US region. During his tenure at DILO, he has been deeply involved with customer projects and industry leadership programs. His duties include, but are not limited to, addressing customer needs and issuing lasting solutions, being a member in IEEE PES Substation Committee subgroups for SF₆ and emerging alternative gases, sharing knowledge and providing guidance to California Air Resources Board, offering standards-based training to SF₆-users, and providing on-site support that is second-to-none.

“Excellent conference that covered the topic very well”

Regional office manager, SECO
INSTRUCTIONAL METHODS

Case studies, PowerPoint presentations, group discussion, and a site visit will be used in this event.

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 0.8 CEUs for the conference and 0.4 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

The event is located at the Anaheim Marriott Suites, 12015 Harbor Blvd, Garden Grove, CA 92840. A room block has been reserved for the nights of February 25-27, 2020. Room rates are US $135. Call 1-714-750-1000 for reservations. Mention the EUCI event to get the group rate. The cutoff date to receive the group rate is January 25, 2020 but as there are a limited number of rooms available at this rate, the room block may close sooner. Please make your reservations early.

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 Aaron Voss at avoss@euci.com or 720-409-0611 for more information.
The event is located at the Anaheim Marriott Suites, 12015 Harbor Blvd, Garden Grove, CA 92840. A room block has been reserved for the nights of February 25-27, 2020. Room rates are US $135. Call 1-714-750-1000 for reservations. Mention the EUCI event to get the group rate. The cutoff date to receive the group rate is January 25, 2020 but as there are a limited number of rooms available at this rate, the room block may close sooner. Please make your reservations early.

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 January 24, 2020 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. EUCI reserves the right to alter this program without prior notice.