



MTU ONSITE ENERGY POWER GENERATION ENGINEERING SYMPOSIUM

OCTOBER 16-17, 2019

YOUR PARTNER FOR



Western Branch
D I E S E L

SESSION OVERVIEWS

Microgrids 101 – Overview & Best Practices

Presenter(s): Brian Ponstein

Focus: Microgrids

This presentation is designed to educate energy professionals (CSEs, owners, distributed energy managers) regarding microgrid and distributed generation projects. The presenter(s) will introduce the topic of microgrids, discuss commonly used power generation technologies and the circumstances that make microgrids an ideal energy solution. During this session, the presenter(s) will provide examples of successful microgrid projects from around the world, highlighting the unique attributes of each project. They will also identify best practices to consider when evaluating and planning a potential project.

- Overview of microgrids.
- Understanding of common power generation technologies used in microgrids.
- Examples of successful installations from around the world.
- Identification of best practices when evaluating and planning a potential microgrid project.

Microgrids 201 – Energy Storage Solutions

Presenter(s): Tom Drake

Focus: Microgrids

This presentation is designed to educate energy professionals (CSEs, owners, distributed energy managers) regarding microgrid and distributed generation projects incorporating battery storage with multiple energy sources, including renewables. During this session, the presenter(s) will discuss the unique benefits and challenges of incorporating battery storage solutions into a microgrid, and provide real-world examples of successful projects including lessons learned and best practices identified.

- Introduction to energy storage solutions.
- Understanding of common benefits and challenges of energy storage.
- Examples of successful, real-world installations.
- Identification of lessons learned and best practices for successful energy storage.

Microgrids 301 – Intelligent Automation Systems

Presenter(s): Christian Mueller

Focus: Microgrids

This presentation is designed to educate energy professionals (CSEs, owners, distributed energy managers) regarding microgrid and distributed generation projects utilizing intelligent control systems. The presenter(s) will discuss consideration factors commonly used to evaluate intelligent automation systems, including monitoring and power resource control capabilities, and impact on system reliability and sustainability. During this session, the presenter(s) will also highlight the benefits of digital simulation capabilities, in which real-world applications are modeled and

analyzed to determine the most economic deployment of energy producing assets.

- Introduction to intelligent automation systems.
- Understanding of common consideration factors including monitoring and power resource control capability, and system impact on reliability and sustainability.
- Benefits of digital simulations to model real-world applications and determine optimal configuration of energy producing assets.

Understanding Generator Set Rating Definitions

Presenter(s): Nick Paolo/Joe Brunetti

Focus: Standby – Diesel and Natural Gas Generator Sets

This presentation is designed to educate energy professionals (CSEs, owners, contractors) regarding generator set rating definitions for power generation projects. The presenter(s) will introduce the following topics: ISO Standards (International Organization for Standardization) that apply to generator sets, manufacturer allowances in regards to ratings, exhaust emissions regulations and finally specific industry ratings commonly used power generation projects. During this session, the presenter(s) will explain various ratings that apply to generator sets (standby, prime, continuous), how generator sets are sized (starting vs. running kW), differences between manufacturer ratings, diesel exhaust emission regulations that apply to generator sets (federal, regional, site specific) and ratings that apply specifically to data centers.

- Introduction to ISO Standards (International Organization for Standardization) for ratings for both diesel and gas generator sets.
- Overview of manufacturer allowances in regards to generator set ratings.
- Develop a basic understanding on how generator sets are sized.
- Introduction of exhaust emission regulations for diesel generator sets.
- Understand specific ratings that apply to generator sets used in data center applications.

Generator Design and Installation Considerations

Presenter(s): Brian Thompson/Steven Toedter

Focus: Generators

This presentation is designed to educate owners, engineers, and contractors about the various factors that effect generator performance and to educate them on the options that are available to them to meet the on-site power generation requirements of their projects. The presentation covers standard rating terminology, options for dealing with various environmental considerations, installation options, and a review of the various codes and standards that apply.

- Understanding of standard generator ratings and terminology.
- Understanding of how to design for the location where the generator will be installed.
- Understanding of installation options available to meet location and functional requirements.
- Understanding of implications of the national, regional, and local codes on the design and installation generators.

Sizing Generator Set Projects Utilizing PS SPEC

Presenter(s): Mike Watts/Zach Dean

Focus: Diesel and Natural Gas Generator Sets

This presentation is designed to educate energy professionals (CSEs, owners, contractors) regarding generator set sizing for building loads in a power systems project. The presenter(s) will introduce the following topics: running kW vs. starting kW, inrush current, motor load starting including motor load starter types (ACL, SSS, VFD), harmonics, load steps/sequencing, site conditions and more.

- During this session, the presenter(s) will explain what information is required to size a generator set to power facility loads, how to enter inputs into the sizing software, tips & tricks for sizing, best practices, and how to interpret a sizing report.

Designing for Reliability

Presenter(s): Ryan Murphy/Charlie Trier

Focus: Diesel Generator Sets

This presentation is designed to educate energy professionals (CSEs, owners, distributed energy managers) in regards to ensuring maximum reliability in power systems through proper design, maintenance, and testing. During this session, the presenter(s) provide real-world examples and lessons learned from complex power system design and installation, long-term service contracts, monthly testing, load banking, spare parts, and emergency contingency planning. The presenters will provide best practices and examples of potential consequences to system reliability.

- How to define reliability.
- Redundancy vs. reliability.
- Examples of successful, real-world installations.
- Examples of failures.

Generator Set Start Up/Facility Tour

Presenter(s): Steve Resner/Kenny Larson

Focus: Diesel Gen

This presentation is designed to educate energy professionals (CSEs, owners, distributed energy managers) regarding one step load pick up of diesel generator sets. The product that will be utilized will be a 3250 kW generator set with our 20V4000 engine. We will initiate start signal and transfer load on to the set in under 10 seconds. We will also be conducting a production facility tour to show the processes of producing a quality product for our customers.

- Introduction to our factory test cells and the equipment to be tested.
- Conduct a one step block load of our 3250 kW 20V4000 system.
- Walking tour of the production facility to show our processes to produce our quality product.

CHP Projects Feasibility Essentials

Presenter(s): Alfredo Carrasco

Focus: CHP

This presentation is designed to educate energy professionals regarding the basic concepts of combined heat and power production and CHP projects feasibility. It will outline electrical and thermal efficiency of typical power production technologies, general system losses, and distributed generation. It will discuss basic information required to asses a potential CHP project, an example of financial advantage of heat recovery plus typical errors and misconceptions.

- Understanding of electrical efficiency concept and main technologies.
- Heat recovery concepts.
- Efficiency and financial Advantages of CHP.
- Basic information required for CHP projects assessment.
- Understanding of Typical errors and misconceptions in CHP projects.

Installation Considerations – Gas

Presenter(s): Justin Wilmes

Focus: Continuous Gas Power Systems

This presentation is designed to educate energy professionals (CSEs, owners, distributed energy managers) regarding continuous gas power systems. The presenter(s) will discuss considerations for best performance and reliability of a continuous gas plant. During the session topics to be discussed will include: site conditions, emissions equipment and regulations, and operational best practices.

- Understanding the impact of site conditions.
- Considerations to boost plant reliability and uptime.
- Understanding emissions requirements and impact.
- Understanding impact of temperature and elevation for sizing.
- Examples of heat recovery solutions.

Biogas Applications – Best Practices in Plant Design for Uptime and Efficiency

Presenter(s): Tom Drake

Focus: Biogas

This presentation is designed to educate energy professionals regarding the design of power plants for anaerobic digesters. Focusing first on market opportunities in North America, including diverted food waste and farm-based anaerobic digestion. How intelligent microgrids can be applied to the changing market—

SESSION OVERVIEWS

changing from long term PPA's to RNG applications. Closing with how to design biogas plants for maximum uptime and efficiency.

- Definition of anaerobic digestion.
- Understanding of market opportunities in North America, both on farm and diverted organic systems.
- Understanding of various gas to power markets.
- Demonstration of how a microgrid with engines can be applied for an RNG facility.
- Benefits of proper balance of plant design to maximize uptime and efficiency.

Benefits of Long Term Service Agreements LTSA

Presenter(s): Juan Matson

Focus: LTSA

This presentation will convey the message to the DG professionals about the reasoning why LTSA is the main pillar in which a given distributed generation project rests and why it must always be an integral portion in the projects negotiation phase regardless of its size of complexity. Not only starting from the development phase in order to determine its feasibility, but most importantly making sure that the project's life cycle stays within the operational costs bandwidth. Understanding the main components of an LTSA and how they are impacted is vital to ensuring project success. All in all, the LTSA ensures a truly win-win-win to the core participants in the DG Value Chain.

- Explain why LTSAs are important from the projects.
- Development and execution point of view.
- Understanding life cycle costing.

CHP Best Practices

Presenter(s): Christian Mueller

Focus: Gas

This presentation will discuss cogeneration principles including combined heat and power (CHP) and combined cooling, heat and power (CCHP). Common factors that influence the success of most cogeneration projects—such as payback period, spark spread, fuel source analysis, and thermal and electrical considerations—will be discussed in detail. Examples of successful cogeneration projects from around the world will be shown, highlighting the unique attributes of each project. Best practices to consider when evaluating and planning a potential cogeneration project will be discussed.

- Overview of cogeneration principles including combined heat and power (CHP) and combined cooling, heat and power (CCHP).
- Understanding of common factors that influence the viability and financial implications of a cogeneration project such as payback period, spark spread, fuel source analysis, and thermal and electrical factors.

- Examples of successful installations from around the world.
- Identification of best practices when evaluating and planning a potential cogeneration project.

Enclosure/Container Solutions

Presenter(s): Gary Farmer

Focus: Gas Systems

This presentation will provide information on different enclosures including performance requirements, design, construction, and application. Choosing between enclosures and buildings will be explained. Design parameters, specifications, and construction will be demonstrated. Descriptive examples of good practice will be explained via actual enclosures from projects around the world.

- Differences between enclosure types.
- Types of enclosures.
- Differences between enclosures and buildings.
- Design requirements and specifications.
- Identification of best practices from around the world.