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Fundamentals of Microgrids™

Microgrids are being deployed throughout the world. The International Energy Agency (IEA) estimates that to achieve a goal of universal access to electricity, most rural areas that currently lack access will need to be connected using mini-grid or off-grid solutions. Other locations will deploy microgrids in the future for cost reduction, energy resiliency and to incorporate electrical generation using alternative energy.

This webinar provides an in-depth overview of microgrid applications and technologies. It includes a compiled set of presentations dealing with microgrids: what they are, how they are configured and ways they are developed. Presentation modules concern microgrid configuration, central and distributed electrical generation and transmission systems, renewables, waste-to-energy systems, energy storage, combined heat and power, fuel cells, and other related power systems. Economic issues and financial methodologies are considered as are the advantages and disadvantages of microgrids. This seminar provides you with:

- Details on how microgrids are configured
- Drivers for developing microgrids
- Using alternative energy in microgrid applications
- Case examples of operational microgrids
- Making a business case for deploying microgrids

Successful applications of microgrid technologies involve a comprehensive understanding of a wide range of technologies plus a balanced understanding of configuration and financial realities. Microgrids, when properly configured, offer sustainable solutions to meet energy resiliency needs. All of these important elements, and much more, have been combined into this intensive 4-day program with manageable 2 ½ hour daily sessions.

Schedule*

4-Days
2.5 Hours per Day
2:30 - 5 pm

Credits

1 CEU
10 PDH
2 AEE

AEE Member

\$945

Non-member

\$995



Agenda *Please refer to your registration confirmation for actual seminar hours.

Introduction to the Seminar

- Introductions (attendees and presenter)
- Satisfying the growing demand for electrical energy
- What are microgrids?
- The importance of microgrid development
- Distributed vs central station generation
- Are microgrids smart grids?
- Roundtable discussion of attendees needs and interests

Environmental Drivers for Microgrid Development

- Issues with central fossil fuel combustion processes
- Increasing costs associated with fossil fuel generation
- The importance of reducing atmospheric pollution
- Transitioning to a low carbon economy

Traditional Electrical Energy Systems

- Utility scale electrical production
- Definition of power
- Fossil fuel systems using the Rankine cycle
- Creating dispatchable power
- How microgrids work within existing supply grid structures
- Monitoring systems

Roots of Microgrids - Power for Individual Buildings

- Naval mini-grid systems
- Net zero energy and net-positive energy buildings
- Nanogrids: building scale independent grids
- Natural gas and diesel cogeneration
- Case studies

Microgrid Architecture

- Critical, sensitive and interconnected electrical loads
- Applications and load leveling approaches
- Off grid and grid-connected systems
- Scalable features
- Advantages (e.g., integration of renewables, load optimization)
- Disadvantages (e.g., costs, bi-directional power flows, stability, regulation)

Linking Microgrids with Renewable Energy

- Hydropower systems (micro-turbines)
- Solar electric generation (thermal and photovoltaic)
- Wind power
- Geothermal electrical generation
- Biofuel combustion systems
- Case studies

Microgrids and Evolving Technologies

- Waste-to-energy systems
- Combined heat and power (CHP)
- Landfill gas and gas turbines
- Plasma-arc gasification processes (PGP)
- Fuel cells

Hybrid Alternative Energy Systems

- What is a hybrid system?
- How are hybrid systems used in microgrids?
- Types of hybrid energy systems
- Case studies

Creative Energy Storage Applications

- Applications for energy storage technologies
- Thermal energy storage
- Mechanical storage approaches
- Battery storage (including rechargeable systems such as flow batteries)
- Grid storage and intermittent power for demand response
- Vehicle-to-grid storage technologies
- Virtual power plants

Microgrids with a Local or Regional Focus

- Examples of microgrid configurations
- Campus and institutional microgrids
- Commercial and industrial microgrids
- District energy microgrids
- Primary, secondary and tertiary controls
- Microgrid optimization/managing peak loads and curtailments
- Case examples

Justifying Microgrids - Financial Approaches and Incentives

- Economics and financial solutions
- Valuing cost and benefits of microgrids
- Microgrid components and their relative costs
- Alternative financing mechanisms (Utility rebate programs, ESPC)
- Marketable environmental attributes (green tags, cap-and-trade programs)
- Risk management
- Business case for microgrid deployment
- The Future of Microgrids
- Redesigning our future with microgrids
- Current research and demonstration projects
- Micro-nuclear energy applications
- Microgrid trends

Online Format

You can participate in the Online Webinar from your office, home, or anywhere you have access to the Internet and a phone or VOIP. You'll have opportunities to interact with your instructor and colleagues in real time during the live teleconferencing sessions.

AEE Program Instructors

— Stephen Roosa PhD, CSDP, CEM, CMVP, BEP

AEE Programs reserves the right to utilize other instructors to teach courses based on instructor availability, scheduling, course need and other factors.

Who Should Attend

This course is intended for professionals whose roles include energy engineering, supervising and managing both sustainable programs, and energy and design professionals. Here's an opportunity to participate part in a focused, fast-paced instructional program, designed both to expand your knowledge in the field.