COGENERATION:
CONSIDERATIONS, ADVANTAGES,
DISADVANTAGES AND ECONOMICS

June 16, 2016
The Westin Buckhead Atlanta
Atlanta, GA

Related Events

HEAT RECOVERY STEAM GENERATOR
(HRSG) FUNDAMENTALS
June 15, 2016

COMBINED CYCLE POWER PLANT
FUNDAMENTALS
June 13-14, 2016
OVERVIEW

This course is intended for those that would like to gain familiarity with the various issues and challenges that are faced when considering the possibility of installing a cogeneration facility. Cogeneration or combined heat and power (CHP) is the simultaneous production of electricity and heat from a single fuel source. Even though the heat and power are fueled from a single source cogeneration is not a single technology, but is an integrated energy system. It is the complexity of the system and the number of different types of entities with very different circumstances that can benefit from the choice to cogenerate that brings to light the many considerations, advantages and possible disadvantages of installing cogeneration. The number of options for any particular plant are many and the methodology is somewhat confusing, this is part of what we hope to break down through out this course. These issues as well as economic considerations, efficiency, permitting and evaluations will be covered in the course.

WHO SHOULD ATTEND

• Those who want to better understand cogeneration options for their facilities
• New employees that are involved with cogeneration plants
• Regulators, communications staff, and others who need a better understanding of cogeneration options and considerations
• Corporate accountants who desire to better understand cogeneration systems and potential cost factors
• Purchasing personnel that want to learn more about the equipment that they purchase fit into a cogeneration plant
• Sales personnel that might want to better understand cogeneration systems to address their customer’s needs

LEARNING OUTCOMES

• Outline cogeneration case studies
• Explain cogeneration and its fundamentals
• Review thermal load and electrical load balances
• Discuss the advantages and disadvantages of cogeneration plants
• Determine combustion, boiler and cycle efficiencies
• Contrast the types of cogeneration plants

INSTRUCTOR

Carl R. Bozzuto / Member and Secretary Treasurer /
Board of Directors of the Council of Industrial Boiler Owners

Carl Bozzuto has more than 40 years of experience in combustion and boiler operations and research. He began his career as a research engineer, senior project engineer, manager, and director for Combustion Engineering Inc. Carl was named vice president of process technology for the company, where he was responsible for the development and commercialization of new boiler and power plant technologies including advanced cycles, ultra supercritical boilers, alternative working fluids, fluid bed boilers, plant integration, and other plant component technology. Serving recently as vice president of technology for the Power Environment Sector at Alstom Power Inc., he was responsible for the development and implementation of new technology for boiler and environmental products on a worldwide basis.

Bozzuto holds 16 U.S. patents and membership in the American Institute of Chemical Engineers (AIChE), the Combustion Institute, and the American Society of Mechanical Engineers (ASME). He has authored more than 30 published technical papers and is editor-in-chief of the textbook, Clean Combustion Technologies, published by Alstom Power in 2009. Bozzuto has earned Bachelor of Science and Master of Science degrees in chemical engineering from the Massachusetts Institute of Technology and a Master of Science degree in management from the Hartford Graduate Center.
What is Cogeneration?
- Generation of heat and generation of power
- Not a combined cycle
- Examples of cogeneration
- First Law of Thermodynamics – covers generation of heat
- Second Law of Thermodynamics – covers generation of power
- Cogeneration combines these two processes

Advantages and Disadvantages of Cogeneration
- Cogeneration is more efficient than generating each separately
- Reduces dependence on the grid
- Allows for "islanding"
- Provides for power when the grid is down
- Cogeneration is more complex
- Requires a balance between thermal load and electrical load
- Implies the need for more redundancy to "island"
- Is not that much more efficient
- Can be costly

Efficiency
- What do we mean by efficiency?
  - Combustion efficiency
  - Boiler efficiency
  - Cycle efficiency
  - Gross and net plant heat rate
  - Cogeneration efficiency
  - Marginal heat rate
- Pitfalls
  - HHV
  - Mixing up first law and second law comparisons
  - Example

Types of Cogeneration Plants
- Boiler with back pressure steam turbine
- Gas turbine with HRSG (with supplementary firing)
- CFB with external heat exchanger
- Trigeneration
AGENDA

Thursday, June 16, 2016 (Continued)

Plant Considerations
- Steam load and its variations
- Electric load and its variations
- Reliability
- Back-up power
- Plant needs
  - Manufacturing
  - Chemical plant
  - Refinery
  - Hospital
  - University
- Hypothetical plant

Economics
- Who owns the plant?
  - Industrial (balance sheet financing)
  - IPP (or 3rd party)
  - Municipal
  - Hospital
  - University
- Cost of Money
- Plant size
- Critical requirements
- Self generation vs Sell to the grid

Permitting and Environmental Issues
- New unit
- Retrofit
- Fuel switching
- Electric generating unit or industrial

Setting-Up an Evaluation
- Site conditions
- Requirements
- Feasibility
- Narrowing down the choices

Case Studies
- University
- Chemical plant
- Industrial park

Review
INSTRUCTIONAL METHODS

This program will use PowerPoint Presentations, group discussions, as well as active participation.

REQUIREMENTS FOR SUCCESSFUL COMPLETION OF PROGRAM

Participants must sign in/out each day and be in attendance for the entirety of the course to be eligible for continuing education credit.

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 course.

EVENT LOCATION

A room block has been reserved at the The Westin Buckhead Atlanta, 3391 Peachtree Road NE, Atlanta, GA 30326, for the nights of June 13-15, 2016. Room rates are $189, plus applicable tax. Call 1-404-365-0065 for reservations and mention the EUCI course to get the group rate. The cutoff date to receive the group rate is May 22, 2016, but as there are a limited number of rooms available at this rate, the room block may close sooner. Please make your reservations early.

PROCEEDINGS

The proceedings of the course will be published, and one copy will be distributed to each registrant at the course.
PLEASE REGISTER THE FOLLOWING

☐ DISCOUNTED REGISTRATION FOR ATTENDING COMBINED CYCLE POWER PLANT FUNDAMENTALS, HEAT RECOVERY STEAM GENERATOR (HRSG) FUNDAMENTALS AND COGENERATION: CONSIDERATIONS, ADVANTAGES, DISADVANTAGES AND ECONOMICS
JUNE 13-16, 2016 : US $2695
EARLY BIRD ON OR BEFORE MAY 27, 2016: US $2495

☐ DISCOUNTED REGISTRATION FOR ATTENDING BOTH HEAT RECOVERY STEAM GENERATOR (HRSG) FUNDAMENTALS AND COGENERATION: CONSIDERATIONS, ADVANTAGES, DISADVANTAGES AND ECONOMICS
JUNE 15-16, 2016 : US $1695
EARLY BIRD ON OR BEFORE MAY 27, 2016: US $1495

☐ COGENERATION: CONSIDERATIONS, ADVANTAGES, DISADVANTAGES AND ECONOMICS COURSE ONLY
JUNE 16, 2016: US $895
EARLY BIRD ON OR BEFORE MAY 27, 2016: US $795

How did you hear about this event? (direct e-mail, colleague, speaker(s), etc.)

Print Name
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OR Enclosed is a check for $ _______________ to cover _______________ registrations.

All cancellations received on or before May 13, 2016, will be subject to a US $195 processing fee. Written cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI event or publication. This credit will be good for six months. In case of event 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.

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