

LEARN HOW TO ENHANCE YOUR OPERATIONS, CONTROL YOUR COSTS, AND EXPAND YOUR CAREER DEVELOPMENT

SOUTHERN CALIFORNIA CHAPTER
ASSOCIATION ENERGY ENGINEERS



Comprehensive Five-day Training Program for Energy Managers

*Covers the 2005 Energy
Policy Act!*

May 2, 3, 4, 7, 8
2012

Energy Resource Center
Southern California Gas Co
9240 Firestone Blvd
Downey, California

*A comprehensive, detailed instructional program
covering the full scope of technical, economic, and
regulatory components of effective energy management.*

**Now Available: The expanded in-depth course you've
been asking for!**

Register online at www.aeesocal.org/professional-development



SOUTHERN CALIFORNIA
CHAPTER
ASSOCIATION OF ENERGY ENGINEERS

Nataka White
ARUP
(310) 578-4538
Mauri Paz
E2 Manage Tech
(562) 732-4140

Email:
cemsignup@aeesocal.org

*This is the course that will
empower you to “put it all
together” and get the results
your company expects.*

*This week-long program of
instruction covers the specific
techniques necessary to
maximize your effectiveness
as an energy manager, vice
president of operations, or
facilities manager.*

*Comprehensive in scope,
this five-day program takes
you systematically from the
underlying fundamentals
to the specific “how to’s.”*

*The optional Certified Energy
Manager (CEM®) examination
will be administered at the con-
clusion of this program
(separate application required).
See inside for details.*



**The Association of
Energy Engineers
Welcomes You...**

CONSIDER THESE IMPORTANT BENEFITS...

- ◆ Teaches you energy management technologies and how to successfully apply them in your building or plant.
 - ◆ Provides new energy managers and facility managers with the in-depth training they need to minimize energy costs and improve energy efficiency.
 - ◆ Covers each topic in sufficient detail so that you are ready to apply new ideas and approaches when you finish the course.
 - ◆ Presents topics initially in an introductory manner, but rather than proceeding as a review, quickly builds to a working level that incorporates practical applications.
 - ◆ Shows the benefits of energy management and how to perform all the calculations needed to understand and control energy costs in buildings and other facilities.
 - ◆ Explains thoroughly the steps in an energy audit or energy survey, and shows how those steps accomplish the overall goal of reducing energy costs.
 - ◆ Offers a hands-on explanation of energy audit instrumentation, and lets you see some of the equipment, meters, and measuring devices that are used to collect data.
 - ◆ Teaches you why utilities want to help their customers save money on their energy bills and become more energy-efficient.
 - ◆ Unravels the maze of buzzwords on energy codes and standards — explains NECPA, PURPA, NGPA, ICP, ASHRAE, CFCs, CAAA of 1990, and NEPA of 1992.
 - ◆ Increases your understanding of the major energy-consuming systems in buildings, and shows how the building envelope affects building energy use.
 - ◆ Reveals how energy is used in your building; how that compares to other buildings.
 - ◆ Covers the various factors that are involved in energy rate structures, and how that knowledge can help you save money.
 - ◆ Devotes enough time to electric rate structures to assure you fully understand how they work, and how you can change equipment, processes, and operating procedures to keep electric costs to a minimum.
 - ◆ Covers economic decision measures thoroughly, then proceeds step-by-step through the development of present values and present worth of discounted cash flows.
 - ◆ Explains fully the various ways to perform life cycle costing.
 - ◆ Teaches you how to evaluate alternative fuel choices and how to capitalize on the benefits of deregulation of gas supply and electric power generation.
 - ◆ Focuses on electrical peak demand control and how much that can save your facility.
- ◆ Examines new lighting technologies to discover what changes can dramatically lower your electric costs — usually with an incentive from your electric utility.
 - ◆ Reveals why motors probably use over half the electric energy in your facility, and how you can cut those costs with high-efficiency motors and adjustable speed drives.
 - ◆ Assures that you understand the basic air conditioning cycle, as well as how to reduce air conditioning costs by using better controls, more efficient equipment, and new technologies like heat pipes and thermal storage.
 - ◆ Makes sure you have a thorough understanding of how boilers, furnaces, and heaters work, and the steps you can take to improve their efficiencies.
 - ◆ Teaches you what cogeneration really is and where it could help you provide low-cost heat and electric power.
 - ◆ Puts all of the pieces together, enabling you to identify and integrate real opportunities to use new equipment, new operating procedures, and new processes to significantly improve energy efficiency and reduce energy costs.



COURSE OUTLINE:

THE NEED FOR ENERGY MANAGEMENT

Building energy cost control
Utility DSM programs and deregulation — energy efficiency and peak demand reduction
Commercial business energy cost control
Industrial plant operation improvement
– Reducing energy costs
– Reducing environmental emissions
– Improving product quality
– Improving plant productivity

CONDUCTING AN ENERGY AUDIT

Purpose of the energy audit
Facility description and data needs
Major systems in the facility
Data forms for recording information
Collecting the actual data
Identification of preliminary energy management opportunities

ENERGY AUDIT INSTRUMENTATION

The need for instrumentation
Light level meters
Electric meters
– Voltages, current, power, energy, power factor
Temperature-measuring instruments
Combustion efficiency measurement
Air flow and air leak measurement
Thermography
Data logging

ENERGY CODES AND STANDARDS

Building codes
ASHRAE standards (62, 15, 3, 90.1)
ASME, IEEE, and other standards
Federal legislation
– NECPA, PURPA, NGPA, CAAA, NEPA of 1992
CFC replacements
– Montreal Protocol, Global Climate Change
National Energy Policy Act of 2005
Proposed tax incentives 2002

BUILDING ENERGY USE AND PERFORMANCE

Fuel types and costs
Energy content of fuels
Energy conversion factors
Building envelope
Natural gas purchasing
Retail wheeling of electricity
Major building energy use systems
ENERGY ACCOUNTING IN BUILDINGS AND FACILITIES
Energy use index, energy cost index
Where energy is used in facilities
Lighting and HVAC energy use

ENERGY RATE STRUCTURES

Identifying types of energy used
Electric rates, gas rates
Oil, coal, and other rates
Steam and hot water rates
Factors in controlling fuel costs
Utility incentive programs

ELECTRIC RATE STRUCTURES

Short history of electric rates
The difference between power and energy
Electric meters
Components of electric rates
Example rate structures
Factors in controlling electric costs
Electric utility incentive programs
Special schedules (interruptible, TOU, real-time pricing)

ECONOMIC ANALYSIS OF ALTERNATIVE INVESTMENTS

Economic decision analysis
Simple economic measures
The time value of money
Present and future values
Cost and benefit analysis
After tax cash flows

ALTERNATIVE FINANCING

Role of performance contracting
Different sources (loans, stock sales, bonds, etc.)
FEMP and alternative financing
True lease, capital lease, bonds, etc.

WASTE HEAT RECOVERY

Objectives: design criteria
Types and maintenance of heat exchangers
Recuperators; economizers

LIFE CYCLE COSTING

Concept of life cycle costing
Purchase costs vs. operating costs
Example analyses
Government standards — FEMP

FUEL SUPPLY AND FUEL SWITCHING

Alternative fuel choices
Technology choices
– HVAC systems, boilers, heaters, industrial processes
Benefits of deregulation — electric, gas, and oil

ELECTRICAL ENERGY MANAGEMENT

Peak load reduction
Power factor improvement
Energy management control systems
Load management
Harmonics and other power quality issues

LIGHTING

Basics of lighting and current lighting technologies
New lighting technologies
Economic evaluation of example lighting improvements
Lighting standards
EPA Green Lights program
T12, T8, T5 lamps
Compact fluorescents
HID, sulfur lamps

MOTORS AND ADJUSTABLE SPEED DRIVES

How motors work
High-efficiency motors
Examples of cost-effective motor changes
Use of adjustable speed drives
Example of cost-effective ASD use
Improved motor belts and drives
Compressed air management
Adjustable speed drive alternatives: eddy current clutches, permanent magnet clutches, variable frequency drives, inlet and outlet vane control, etc.

HVAC SYSTEM

Types of HVAC systems and new technologies
The vapor-compression cycle
Air conditioning loads
Chiller improvement example
Control, thermal storage, absorption systems

CONTROLS AND ENERGY MANAGEMENT

Night set back
Optimum start/stop

The ideal course for any professional seeking...

- ◆ To become a good (or better) energy manager.
- ◆ To take and pass the CEM exam.
- ◆ To know what energy management can do for their company.
- ◆ To know what to expect from energy management consultants.

Enthalpy economizers
Temperature resets
PID controls, pneumatic controls
Control characteristics
DDC

INSULATION

Types of insulation
Heat flow calculations
Economic levels of insulation
Passive thermal energy
Process insulation

GREEN BUILDINGS, LEED®, AND ENERGY STAR

Green buildings and sustainable design
U.S. Green Buildings Council and LEED®
LEED® certification: LEED®-NC, EB, CI, CS
ASHRAE 90.1 Energy Cost Budget Method
Energy and atmosphere, indoor environmental quality, water efficiency
EPA and the ENERGY STAR program
ENERGY STAR Building Label
Energy performance ratings and profile manager

BOILERS AND STEAM GENERATION

Basics of combustion systems
– Excess air control
Boiler efficiency improvement
– Blowdown management, condensate return, turbulators
Combustion controls
Waste heat recovery
Steam traps — purpose and testing
Process insulation
Example of boiler improvement

COGENERATION (CHP)

What is cogeneration
Types of cogeneration cycles
Examples of cost-effective use of cogen
QF's and deregulation
Use of waste for fuel
Fuel cells, microturbines, etc.

MAINTENANCE

Maintenance management systems
Monitoring for maintenance
Infrared photography for maintenance
Cost of:

– Air, steam, gas leaks; uninsulated surfaces

ALTERNATIVE FINANCING

Different financing methods
Attributes of each method
After-tax cash flow analysis

\$1,500 for five day course Please add \$200 for exam

Please make your check payable to **AEE SoCal Chapter** and mail to:

Tax ID: 91-1954727

Nataka White
ARUP
12777 West Jefferson Blvd Ste 200
Los Angeles, CA 90066
(310) 578-4538
nataka.white@arup.com



Card # _____ Exp: _____ Signature: _____