The Certified Energy Manager (CEM®) Program for Professional Certification

Date: 11- 14 December, 2006

Venue: To be Advised (in Hong Kong)

Course Code: CEM 01/06/HK

THE MARK OF AN ENERGY PROFESSIONAL

Since it's inception in 1981, the Certified Energy Manager (CEM®) credential has become widely accepted and used as a measure of professional accomplishment within the energy management field. It has gained industry-wide use as the standard for qualifying energy professionals both in the United States and worldwide. It is recognized by the U.S. Department of Energy, the Office of Federal Energy Management Programs (FEMP), and the U.S. Agency for International Development, as well as by numerous state energy offices, major utilities, corporations and energy service companies. By attaining the status of CEM, you will be joining an elite group of 6,000 professionals serving industry, business and government throughout the U.S. and in 22 countries. These high-achieving individuals comprise a "Who's Who" in the energy management field.

COMPREHENSIVE 4-DAY TRAINING PROGRAM FOR ENERGY MANAGERS (prep: CEM Certification)

This is the first ever course (same as the course held in USA) with the USA instructors traveled from the headquarters to Hong Kong. Metric units will be taught in Hong Kong instead of Imperial units in USA. CEM certificates will be issued directly from Association of Energy Engineers (USA Headquarters) after passing the exam with eligibility conditions of experience and qualifications. To obtain further information on the CEM program, please visit the web site www.aeecenter.org/certification/cem.

Course Price:	**US $1,695.00**	**(HK $13,240)**
Exam Price:	**US $200.00**	**(HK $1,560)**

ABOUT THE COURSE

This special in-depth four-day course is ideal for professionals who seek a more detailed program of instruction covering the technical, economic and regulatory aspects of effective energy management. The program provides detailed coverage of all of the 26 training sections specified for energy managers in the field, and offers a comprehensive learning and problem-solving forum for those who want a broader understanding of the latest energy cost reduction techniques and strategies.

INSTRUCTORS

BARNEY L. CAPEHART, Ph.D., C.E.M., is a professor emeritus of industrial and systems engineering at the University of Florida, Gainesville. He has broad experience in the commercial/industrial sector, having served as director of the University of Florida Industrial Assessment Center from 1990 to 1999. He has personally conducted over 100 audits of industrial facilities, and has assisted students in conducting audits of hundreds of office buildings, and other non-industrial facilities. He is a fellow of IEEE, IIE, and AAAS.

SCOTT C. DUNNING, Ph.D., P.E., C.E.M., is the Executive Director of the Advanced Manufacturing Center at the University of Maine where he leads energy assessments and production line development for industrial manufacturers. He was the founding director of the Industrial Assessment Center at the University of Maine where he directed over 200 audits of industrial facilities throughout New England. He previously served as a Program Manager at the U.S. Department of Energy where he assisted in management of the Industrial Assessment Center program and reported to the U.S. Congress regarding implementation efforts of the Energy Policy Act of 1992. He is a Professor of Electrical Engineering Technology at the University of Maine where he teaches courses in power systems analysis, energy conversion and engineering economics.

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	**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 1992	**INDOOR AIR QUALITY** ● Standards of care: ASHRAE Standard 62 ● Reasons for managing indoor air quality ● Acceptable air quality ● Ventilation rate procedure, Air quality procedure ● Typical air contaminants; VOCs and bioaerosols ● IAQ problems; CO2 measurement and control ● AEE Certified IAQ Professional requirements
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 reports	**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, realtime pricing)	**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

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
- Ultrasonic leak detectors
- Data logging

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

WASTE HEAT RECOVERY (5)

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

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, variable frequency drives, inlet and outlet vane control, etc.

MANAGEMENT

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

HVAC SYSTEM

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

GREEN BUILDINGS

- Introduction to sustainability
- The USGBC and the LEED rating systems for new construction (NC) and existing building (EB)
- Summarization of the prerequisites and credits for LEED NC
- Summarization of the prerequisites and credits for LEED EB
- EPA ENERGY STAR Program and Portfolio Manager
- ASHRAE Green Guide
- Benefits to the community, owners, and occupants

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 and gas

ALTERNATIVE FINANCING

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

BUILDING COMMISSIONING

- What is commissioning-including new and existing buildings?
- Why we need commissioning and its benefits
- The project team: roles and responsibilities
- New building commissioning: project phases
- Retro-commissioning, recommissioning: project phase objectives
- Total and whole building commissioning
- Testing, adjusting, and balancing-verification, system by system
- Summary of applicable codes, organizations, guidelines: ASHRAE, USGBC LEED,
- SMACNA, BCA, AEE's CBCP Certification

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

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

ECONOMIC ANALYSIS OF ALTERNATIVE INVESTMENTS

- Economic decision analysis
- Simple economic measures
- The time value of money
- Present and future values
- Cost and benefit analysis
- Rate of return
- Life cycle costing
- After tax cash flows

CONTROLS AND ENERGY MANAGEMENT

- Night set back
- Optimum start/stop
- Enthalpy economizers
- Temperature resets
- PID controls, pneumatic controls
- Control characteristics
- BACNET and LONworks; TCP/IP; GUIs
- DDC

WASTE HEAT RECOVERY

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

INSULATION

- Types of insulation
- Heat flow calculations
- Economic levels of insulation
- Passive thermal energy
- Where the action is?

COGENERATION (CHP)

- What is cogeneration
- Types of cogeneration cycles
- Examples of cost-effective use of cogen
- QF and deregulation
- Use of waste for fuel

MAINTENANCE

- Maintenance management systems
- Monitoring for maintenance
- Infrared photography for maintenance
- Cost of: Air, steam, gas leaks; uninsulated surfaces

Examination Requirement

All CEM candidates must satisfactorily complete a four-hour written open-book exam, proctored by an approved exam administrator. Of the following seventeen sections of the exam, candidates must complete at a minimum of eleven, including those indicated as **Required**:

1. Codes & Standards & Indoor Air Quality - **Required**
2. Energy Accounting and Economics - **Required**
3. Energy Audits and Instrumentation - **Required**
4. Electrical Systems
5. HVAC Systems
6. Motors and Drives
7. Industrial Systems
8. Building Envelope
9. Cogeneration and CHP Systems
10. Energy Procurement
11. Building Automation and Control Systems
12. Green Buildings, LEED & Energy Star
13. Thermal Energy Storage Systems
14. Lighting
15. Boiler and Steam Systems
16. Maintenance & Commissioning
17. Alternative Financing

Eligibility

The prerequisites to qualify for the certification process have been designed to take into account the possible diversity of education and practical experience an individual may have. However each CEM candidate must meet one of the following criteria:

- A four-year **engineering degree and/or P.E.**,
  with at least ***three*** years experience in energy engineering or energy management.
- A four-year **business or related degree**,
  with at least ***five*** years experience in energy engineering or energy management.
- A two-year **technical degree**,
  with ***eight*** years experience in energy engineering or energy management.
- ***Ten*** years or more **verified experience** in energy engineering or energy management.

  (Note: Letters of reference and verification of employment must be submitted.)

Application forms will be distributed the students after the course/exam for the CEM certification.

< REPLY SLIP >

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To register, please complete the reply slip by fax 2343 3132 and mail with your crossed cheque payable to:

"**AEE Hong Kong Chapter"**

c/o ISPL Consulting Ltd

Unit 502, Kwai Hung Holdings Centre, 89 King's Road, North Point, Hong Kong,

Attention: Dr. Leonard Chow, (Course Convener)

(Course Enquiry: 2566 3397, leonardchow@ispl.com.hk)

Deadline: *11 October 2006*

(Very Limited Students Intake)

CEM Course		Fee
Package A	**Course Only**	**HK$13,240 each**
Package B	**Course + Examination + CEM Certificate**	**HK$14,800 each**

Package A: _____ or Package B: _____ (Tick as appropriate)

Name: _____(Ir/Mr/Ms/Miss)

Organization: _____

Address: _____

Email Address: _____ Fax #: _____

Contact Phone: (Office)_____ (Mobile)_____

Cheque no.: _____ Amount (HK$): _____