



Certified Energy Manager (CEM®) Course

Course length:

5 days, including exam

Who should take this training?

- Engineers or professionals involved in energy efficiency related work.
- Building or industry owners who wish to acquire knowledge in energy savings
- Building or industry owners who wish to partner with ESCOs to implement Energy Efficiency (EE) projects.
- Employees responsible for EE program and operation.
- ESCO employees required to conduct energy audits,
- Project managers, Energy managers, and policies makers.
- Energy Services Specialist
- Green Mark Managers/Professionals

Website:

www.efficienterra.com.sg

Enquiry:

enquiry@efficienterra.com.sg

The world most recognized professional certification in energy management is the Certified Energy Manager (CEM). Its credential is now spread widely among the industries as a prerequisite in energy related career. When you've earned the right to put the initials "CEM" behind your name, you've distinguished yourself among energy management professionals. By attaining the status of CEM, you will be joining an elite group of more than 14,000 professionals serving industry, business and government throughout the U.S. and in more than 25 countries abroad.

This special 5-day seminar provides an in-depth, comprehensive learning and problem-solving forum for those who want a broader understanding of the latest energy cost reduction techniques and strategies. All CEM candidates must attend this CEM training seminar, and complete and pass a four-hour written exam, proctored by an approved exam administrator.

Course Outline Overview:

- The need for Energy Management
- Conducting the Energy Audit
- Energy Audit Instrumentation
- Energy Codes & Standards
- Building Energy Use & Performance
- Energy Accounting in Buildings & Facilities
- Energy Rate Structures
- Electric Rate Structures
- Economic Analysis & Life Cycle Costing
- Alternative Financing
- Waste Heat Recovery
- Fuel Supply & Fuel Switching
- Electrical Energy Management
- Lighting
- Motors & Adjustable Speed Drives
- HVAC System
- Controls & Energy Management
- Insulation
- Green Buildings, LEED® & ENERGY STAR
- Boilers & Steam Generation
- Cogeneration (CHP)
- Maintenance

Please refer to the last page of this leaflet for the detail outline of this course.



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:

Education		Experience
4-year degree in engineering or architecture OR Professional Engineer (PE) or Registered Architect (RA)	AND	3+ years of experience in energy engineering or energy management
4-year degree in environmental science, physics, or earth science	AND	4+ years of experience in energy engineering or energy management
4-year degree in business (or related field)	AND	5+ years of experience in energy engineering or energy management
2-year energy management associate's degree	AND	6+ years of experience in energy engineering or energy management
2-year technical associate's degree	AND	8+ years of experience in energy engineering or energy management
NONE	AND	10+ years of experience in energy engineering or energy management

Course Information:

For further information, please visit the website at www.efficienterra.com.sg/register.html

EfficientTerra Services Pte Ltd

1 Raffles Place #44-02, One Raffles Place Tower One, Singapore 048616

Tel: +65 8285 5207

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Seminar Outline for Comprehensive 5 days Training Program for Energy Managers

THE NEED FOR ENERGY MANAGEMENT <ul style="list-style-type: none"> • Building energy cost control • Utility DSM programs & deregulation • Energy efficiency & peak demand reduction • Commercial business energy cost control • Industrial plant operation improvement 	ECONOMIC ANALYSIS OF ALTERNATIVE INVESTMENTS <ul style="list-style-type: none"> • Economic decision analysis • Simple economic measures • The time value of money • Present and future values • Cost and benefit analysis • After tax cash flows 	LIGHTING <ul style="list-style-type: none"> • Basics of lighting and current technologies • New lighting technologies • Economic evaluation of lighting improvements • Lighting standards • T12, T8, T5 lamps • Compact fluorescents • HID, sulfur lamps
ENERGY AUDIT INSTRUMENTATION ENERGY CODES AND STANDARDS <ul style="list-style-type: none"> • Building codes • ASHRAE standards (62, 15, 3, 90.1) • ASME, IEEE, and other standards • Montreal Protocol, Global Climate Change • National Energy Policy Act of 2005 	BUILDING ENERGY USE & PERFORMANCE <ul style="list-style-type: none"> • 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 	CONTROLS AND ENERGY MANAGEMENT <ul style="list-style-type: none"> • Night set back • Optimum start/stop • Enthalpy economizers • Temperature resets • PID controls, pneumatic controls • Control characteristics • DDC
ENERGY ACCOUNTING IN BUILDINGS & FACILITIES <ul style="list-style-type: none"> • Energy use index, energy cost index • Where energy is used in facilities • Lighting and HVAC energy use 	ELECTRIC RATE STRUCTURES <ul style="list-style-type: none"> • Difference between power & energy • Electric meters • Components of electric rates • Factors in controlling electric costs 	WASTE HEAT RECOVERY <ul style="list-style-type: none"> • Objectives: design criteria • Types & maintenance of heat exchangers • Recuperators; economizers
CONDUCTING AN ENERGY AUDIT <ul style="list-style-type: none"> • Purpose of the energy audit • Facility description and data needs • Major systems in the facility • Collecting the actual data • Identifying preliminary opportunities 	ALTERNATIVE FINANCING <ul style="list-style-type: none"> • Role of performance contracting • Different sources • FEMP and alternative financing • True lease, capital lease, bonds, etc. 	LIFE CYCLE COSTING <ul style="list-style-type: none"> • Concept of life cycle costing • Purchase costs vs. operating costs • Example analyses
COGENERATION (CHP) <ul style="list-style-type: none"> • What is cogeneration? • Types of cogeneration cycles • Examples of cost effective use of cogeneration • QF's and deregulation • Use of waste for fuel • Fuel cells, microturbines, etc. 	MOTORS & ADJUSTABLE SPEED DRIVES <ul style="list-style-type: none"> • How motors work • High efficiency motors • Examples of cost effective motor changes • Use of adjustable speed drives/examples • Improved motor belts and drives • Compressed air management • Adjustable speed drive alternatives 	GREEN BUILDINGS, LEED®, & ENERGY STAR <ul style="list-style-type: none"> • Introduction to sustainability • The USGBC & LEED rating systems for new construction (NC) & existing building (EB) • Prerequisites and credits summary for LEED NC & EB • EPA ENERGY STAR Program and Portfolio Manager • ASHRAE Green Guide
FUEL SUPPLY & FUEL SWITCHING <ul style="list-style-type: none"> • Alternative fuel choices • Technology choices • Benefits of deregulation: electric, gas & oil 	ELECTRICAL ENERGY MANAGEMENT <ul style="list-style-type: none"> • Peak load reduction • Power factor improvement • Energy management control systems • Load management • Harmonics and other power quality issues 	MAINTENANCE <ul style="list-style-type: none"> • Maintenance management systems • Monitoring for maintenance • Infrared photography for maintenance • Cost of air, steam, & gas leaks • Uninsulated surfaces
HVAC SYSTEM <ul style="list-style-type: none"> • Types of HVAC systems & new technologies • The vapor compression cycle • Air conditioning loads • Chiller improvement example • Control, thermal storage, absorption systems 	BOILERS & STEAM GENERATION <ul style="list-style-type: none"> • Basics of combustion systems • Excess air control • Boiler efficiency improvement • Combustion controls & waste heat recovery • Steam traps — purpose and testing • Process insulation • Example of boiler improvement 	INSULATION <ul style="list-style-type: none"> • Types of insulation • Heat flow calculations • Economic levels of insulation • Passive thermal energy • Process insulation

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