

Hawai'i Energy
Certified Energy Manager® Training Application

O'ahu (with remote option): January 23-27, 2023
In person at Hawaii Energy training room
45 N. King St #500, Honolulu HI 96817

Name: _____
Mailing Address: _____
City/State/Zip: _____
Business Phone: _____ Home or Cell Phone: _____
Email (work): _____ Email (home): _____
Your Employer: _____ Position: _____

If I meet the basic requirements listed below and if I am selected by Hawai'i Energy for sponsorship in the CEM program I agree to: (please initial)

- _____ *Pay \$595 and Hawai'i Energy will pay remainder of program cost (\$2,400) on my behalf.*
- _____ *Be photographed and allow photos to be used by Hawai'i Energy in future program publicity.*
- _____ *Receive occasional email communications from Hawai'i Energy.*
- _____ *Complete an evaluation of the program.*
- _____ *Allow Hawai'i Energy to request exam pass/fail information from AEE.*

Applicant Signature

Date

ATTACH THE FOLLOWING TO THIS APPLICATION:

- 1. Please provide a resume demonstrating a minimum of one year's experience at the facility of a Honolulu, Hawai'i or Maui County electric utility ratepayer in any of the following areas: building operations, engineering, lighting, maintenance, or HVAC system. On the resume, please include one contact person and contact information from a current or previously held employer.**
2. Complete application; scan, and email all materials to Karen Shishido at shishidok@leidos.com by application deadline: **Tuesday, January 3, 2023.**
3. Application will be reviewed within 2 business days and if approved, you will be sent a private link to the AEE registration pages for the remote or in-person option, make payment of \$595 and registration processing will proceed. All Oahu residents are highly encouraged to attend in person.

Note, qualifications and application for earning the CEM credential are separate from Hawaii Energy's criteria for taking the course and receiving the tuition subsidy, and are determined by/reviewed by AEE. See website at <https://www.aeecenter.org/certified-energy-manager> for complete guidelines and information about the CEM and EMIT certification.

Hawai'i Energy Review: _____
Program Administrator

Approved/Not approved

Date

Hawai'i Energy's mission is to empower island families and businesses to make smarter energy choices to reduce energy consumption, save money, and pursue a 100% clean energy future. Hawai'i Energy is a ratepayer-funded conservation and efficiency program administered by Leidos Engineering, LLC. under contract with the Hawai'i Public Utilities Commission.

Certified Energy Manager® (CEM®) Training - Supplemental Information

Course Description:

The Certified Energy Manager (CEM) designation is one of the most globally respected in the field of energy management. Since 1985, professionals from over 100 countries have participated in AEE's approved CEM training programs. This course covers many facets of energy management and prepares students for the 4-hour CEM exam. This multi-day program is only taught by instructors with greater than 20 years' experience in the industry. They present the latest practices, strategies, and theories, while leading discussions in an open, interactive environment. You also spend invaluable time connecting with and learning from, other program attendees. In each topic covered, the instructors focus on the most "useful" and "proven" activities that an energy manager should pursue to improve profits.

The CEM program is accredited under ANSI/ISO/IEC 17024 for Personnel Certification Bodies. It is also recognized under the Better Buildings Workforce Guidelines and meets the criteria of an energy auditor. Register today and take the first step to join a network of professionals that lead the field.

Seminar Highlights:

- Learn how to optimize energy use and costs within non-residential buildings
- Understand how energy is purchased and then used in various systems (HVAC, Lighting, Motors, Boilers, etc.) throughout a building
- Understand a holistic approach to seeing the big picture on optimizing systems to reduce costs, improve profits and increase occupant satisfaction.

Target Audience:

- Energy Engineers
- Energy Managers
- Building Facility Managers Government
- Facility Managers
- Industrial Facility Managers
- Utility Account Managers
- Energy Service Performance Managers
- Energy Efficiency Consultants
- Project Engineer
- Resource Efficiency Managers (REMs)

Learning Level: Advanced

The course is intensive and covers complex concepts, but is explained so that anyone can learn a great deal. 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. Each CEM **candidate must meet one** of the following criteria*:

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

Participants will earn 3.2 CEU | 32 PDH | 6.4 AEE Credits for completing this program.

*Please note this differs from Hawaii Energy's requirements to qualify for tuition subsidy and taking the course. This is because we understand not everyone has the work experience or background to earn the CEM, but may be able to earn an EMIT or Energy Manager in Training credential while working and gaining more experience. Please see AEE website: <https://www.aeecenter.org/certified-energy-manager>

Certified Energy Manager®

Training Program

Daily Agenda

Day 1

Why Energy Management is Important, become aware of:

- Global trends on Energy, Economy and our Environment
- Non-Technical Drivers that create the need for energy projects
- Selling Points for Energy Projects

Energy Basics

- Energy Fundamentals
- Energy Conversion Factors & Application
- Comparing Energy vs. Power

Fuel Supply and Pricing

- Overview of Utility Rate Components
- Electric & Natural Gas Energy Procurement
- DSM & Demand Response
- Benchmarking Energy Information

Energy Audits and Instrumentation

- Energy Programs (ISO 50001, DOE & EPA Resources)
- Audit Strategies / Approaches
- Benchmarking, Level I, II, and III Audits (ASHRAE Standard 211-2018)
- Investment Grade Audits
- Reports
- Data collection technologies and instruments related to energy systems
- Data logging and communication technologies

Codes and Standards

- Scope of relevant ASHRAE Standards (55.1, 90.1, 135, 189, 62.1)
- How ASHRAE Standards affect Green Energy & Federal Building Energy Codes
- Ability to estimate minimum air flow requirements (Ventilation Rate Procedure)

High Performance Green Buildings

- Leadership for Energy & Environment Design (LEED) Program & Benefits
- Energy Star Program & Benefits

Day 2

Energy Accounting and Economics

- Economic Analysis & Terminology
- Time Value of Money (TVM) Tables / Compound Interest Factors
- Calculate Key Financial Metrics: Net Present Value, PV, Life Cycle Cost, IRR, SIR & Simple Payback

Electrical Power Systems

- Electrical Basics (DC/AC, Single & 3-Phase Power)
- Resistive & Inductive Loads, Power Factor
- Voltage Imbalance, Grounding & Harmonics
- Estimating Savings from Power Factor Improvement
- Important 3-phase Motor Equations & Estimating Power Consumption

Motors and Drives

- Savings Considerations: Lifecycle vs. First Cost for Installing Energy Efficient Motors / VSDs
- Motor Terminology & Performance Factors
- Load Factors & Ability to Estimate Motor Loads
- Centrifugal Devices: Fan / Affinity Laws
- Variable Volume Options & Frequency Drives (VFD)

Lighting Systems

- Lighting Retrofits: Evaluate & Identify Opportunities for High Energy Saving Potential
- Lighting Design Basics & Terminology
- How to Avoid Common Mistakes of Lighting Retrofits
- Practical Approaches to Audits and Upgrades

Maintenance and Commissioning

- Useful Maintenance Technologies
- Basic Terminology & Common Maintenance Strategies
- Estimating Savings from Maintenance Activities (Compressed Air & Steam Leaks, Uninsulated Steam Lines, Group Relamping)

Continued on next page...

Certified Energy Manager® Training Program

Daily Agenda Continued

Day 3

HVAC Systems

- Types & Functions of HVAC Systems
- Vapor Compression Cycle, COP, EER, SEER, IPLV
- HVAC Energy Efficiency Measures
- Distribution Systems
- Psychrometric Chart & Processes
- Sensible & Latent Heat Transfer Calculations

Building Envelope

- Conduction, Convection, Radiation, and Infiltration
- Conductivity, Conductance, and R Values
- Sources of Building Heat Gain/Loss (Solar Heat Gain Coefficient)
- Ability to Perform Seasonal Energy Consumption Calculations
- Degree Day Formula Use

Building Automation and Control Systems

- Optimization & Safety for Various Energy-Related Systems
- PID Algorithms
- Basic Control Terminology
- Automation Systems Interoperability and IoT
- Current Technologies & Hardware and Energy Savings Strategies

Thermal Energy Storage Systems

- TES Terminology & Basic Designs
- Storage / Peak Shaving Strategies
- Storage Media Options
- Calculating Approximate Savings & Storage Size

Day 4

Boiler and Steam Systems

- Water Tube, Fire Tube, & Condensing Boilers
- Saturated & Superheated Steam
- Estimate Combustion Efficiency
- Calculate Heat Flows & Enthalpy Values using Steam Tables
- Energy Savings: Blowdown Heat Recovery, Flash Steam Utilization, Economizers, & Air Preheating

CHP Systems and Renewable Energy (Combined Heat & Power)

- Benefits of CPH Systems
- Calculating Basic Fuel Equation for CHP Systems
- Comparing CHP Fuel & Operating Costs vs. Utilities
- Comparing types of Renewable Energy & Storage Technologies

Industrial Systems

- Savings Estimates for Pumps, Compressed Air Systems and Waste Heat Recovery
- Pumps: Pump Curves & System Optimization Approaches
- Identifying Energy Waste Streams within Industrial Facilities

Energy Savings Performance Contracting and Measurement and Verification

- Financing / Performance Contracting (Cost of Delay vs. Financing Cost)
- 3rd Party Financing Options
- Performance Contracting Benefits vs. Risks
- EVO IPMVP Guidelines and Measurement Methods
- M&V Terminology, Check Ups, and Determining Best Approach for an ECM

Day 5

Open Q&A

Certification Exam

🕒 *Exam Sign-In for in-person starts one hour before exam which starts at 9:00 am. Participants have up to 4 hours to complete the exam.*

🕒 *Remote attendees will need to schedule a remote, proctored exam with the testing service. Instructions will be provided.*