



## Certified Energy Manager®

Recognized as the Highest Standard for Energy Efficiency Professionals.

### Who are Certified Energy Managers?

- Are you an energy manager looking to validate your experience and knowledge?
- Are you a consultant that specializes in improving the energy efficiency of buildings and building systems?
- Are you a building owner or manager looking to understand how energy savings can finance your next project?
- Are you involved in developing energy efficiency projects, strategies or sustainability programs for your organization or your clients?

A Certified Energy Manager is an individual who optimizes the energy performance of a facility, building, or industrial plant. The CEM is a systems integrator for electrical, mechanical, process, and building infrastructure, analyzing the optimum solutions to reduce energy consumption in a cost-effective approach. CEM's are often team leaders and help to develop and implement their organizations' energy management strategies. CEM's have gained increased recognition within the energy industry and by companies looking to strengthen their competitive position by having responsible energy strategies and sustainable operational practices.



#### What does the Certified Energy Manager (CEM®) Certification Program offer?

This program helps educate and qualify individuals involved in optimizing the use of energy in buildings and systems. By obtaining the CEM certification, candidates gain industry and peer recognition by demonstrating their understanding of energy-efficiency principles, practices, and technologies. The program raises the professional standards, both technical and ethical, of those engaged in energy efficiency and energy management.

#### What is the bottom line for me or my company?

Gaining a wide-reaching and industry-recognized certification is always a personal and financial investment. Since its inception in 1981, the CEM certification program has demonstrated its validity year after year. Individuals tell us a CEM certification has helped improve their career, improve their salary, and increase their job responsibility. Holding a CEM certification shows a fundamental understanding of the industry and a commitment to their profession. Companies, organizations, and consultants with a CEM on-staff often see a higher affinity with their customers because CEMs understand their customer's requirements, speak the language of energy efficiency, and are a trusted, unbiased source for accurate information.

**More Information**  
CEM® Website

## What functional areas does the CEM® Certification Program cover?

The certification program requires fundamental knowledge across several core principles and practices specific to energy management in buildings and facilities. These include:

- Codes and Standards
- Energy Accounting and Economics
- Energy Audits and Instrumentation
- Electrical Power Systems and Motors
- HVAC Systems
- Industrial Systems
- Building Envelope
- CHP Systems and Renewable Energy
- Fuel Supply and Pricing
- Building Automation and Control Systems Thermal Energy Storage Systems
- Lighting Systems
- Boiler and Steam Systems
- Maintenance and Commissioning
- Energy Savings Performance Contracting and Measurement & Verification

## How do I become eligible for AEE's CEM® certification?

Every certification program offered by AEE is defined by strict standards to ensure the program maintains its industry-wide recognition and credibility. To that end, AEE stipulates three criteria that all CEM candidates must meet. Firstly, applicants must have relevant experience or educational credentials (see below). Secondly, candidates must undergo a defined training program that aligns with the fundamental knowledge base of the program, and the principles and practices of the industry as a whole. Thirdly, candidates must pass the associated exam to demonstrate their technical knowledge, proficiency, and abilities in the area of energy efficiency.

### Experience & Education

Applicants must meet one of the following eligibility criteria:

- Hold a 4-year engineering or architectural degree OR Professional Engineer (PE) OR Registered Architect (RA) and 3+ years related\* work experience.
- Hold a 4-year technology, environmental science, physics, or earth science degree and 4+ years related\* work experience.
- Hold a 4-year business degree and 5+ years related\* work experience.
- Hold a 2-year energy management associate degree and 6+ years related\* work experience.
- Hold a 2-year associate degree and 8+ years related\* work experience.
- Have 10+ years related\* work experience

## What is the CEM®, and how was it developed?

The Certified Energy Manager (CEM®) accreditation is one of the most globally respected in the field of energy management. Since 1981, over 30,000 professionals from over 100 countries have participated in AEE's CEM program. The program is ISO IEC 17024 accredited by Entidad Nacional de Acreditación (ENAC) and American National Standards Institute (ANSI,) and is also a U.S. Department of Energy Better Buildings Workforce Guidelines Recognized Program. It is also accredited by many other organizations worldwide. See [aeecenter.org/cem](http://aeecenter.org/cem) for a complete list.

## Why would I want to take a training program when I believe I already have the knowledge and experience required to pass an exam?

A CEM training program provides more value than only preparing individuals to take the associated exam. It brings all candidates to a base level of understanding across a wide variety of energy management topics.

For those entrenched in their normal daily activities, attending a training program, held away from the office, in a classroom environment can be a catalyst for improvement and change. For many, the chance to network, connect, and learn from other like-minded individuals is incredibly valuable.

## I obtained my CEM® Certification, where do I go next?

The CEM certification can help define your status as an energy professional and help progress your career. Once complete, make sure you maintain your account and keep track of your certification on [aeecenter.org](http://aeecenter.org).

You can also keep up to date on energy management practices and technologies by joining your local AEE Chapter. Energy professionals continuously tell us that they stay ahead in the industry by getting involved in their local community.

**Find Your Local Chapter**  
AEE Chapter Search

\*Related degree in science, engineering, architecture, business, law, finance, or related field and related experience in energy, building or facility management, or measurement and verification.

## Which companies and industries value the Certified Energy Manager (CEM®) certification?

You can find CEMs across markets and industry sectors, from utilities, ESCOs, major multi-national corporations, power companies, respected controls contractors, and manufacturers, to federal, state, and local governments, military, universities, and school boards. Many of these organizations require a CEM certification as a condition of hiring or a requirement for advancement. Government organizations request the certification within "Requests for Proposals." The following list is a sample of companies across a wide range of industries that have demonstrated they value Certified Energy Managers.

- 3M
- 3M Canada
- Abbott Laboratories
- AK Steel
- ALCOA
- Alliance to Save Energy
- American Axle & Manufacturing
- Amgen
- Anheuser Busch
- ArcelorMittal
- Archer-Daniels-Midland
- AstraZeneca
- Atlas Copco Canada
- Baxter Healthcare
- Bayer Corporate & Business Services
- Bechtel National
- BMW Manufacturing Corporation
- Boeing
- BP North America
- Briggs & Stratton Corporation
- Bristol Myers Squibb
- Burrows Paper Corporation
- CalsonicKansei North America
- Cargill
- Carrier Corp - UTC
- Caterpillar Inc
- CEMEX, Inc.
- Chevron
- Chrysler
- Conoco Phillips
- Cummins
- Dana Holdings Corporation
- Deere & Co.
- Dell, Inc
- Delphi Corporation
- Duracell
- Eastman Chemical Company
- Eli Lilly & Company
- Eurocan Pulp and Paper
- ExxonMobil
- Fluor
- Ford Motor Company
- Freescale Semiconductor
- Frito-Lay, Inc.
- Fruit of the Loom
- GE Energy
- GE Wind Energy LLC
- General Mills Inc.
- General Motors Energy & Utilities Services Group
- General Motors of Canada
- Georgia Tech Enterprise Innovation Institute
- GlaxoSmithKline
- GM - Brazil
- Goodyear Tire & Rubber Co
- Harley-Davidson Motor Company
- Hess
- Hewlett-Packard
- Hormel Foods
- IBM
- Intel
- John Deere
- Johnson & Johnson
- Kimberly-Clark
- Kraft Foods
- La-Z-Boy Inc
- Lockheed Martin
- Lone Star Steel Company
- Masco Corporation
- McCain Food USA
- Merck
- MillerCoors, LLC
- Motorola
- Nalco Company
- Nestle Purina Pet Care.
- Nestle USA, Inc.
- Northrop Grumman
- Novartis
- Owens Corning
- Papa John's International
- Penske Truck
- PepsiCo
- Petrobras
- Pfizer
- PPG Industries
- Pratt & Whitney
- Pratt & Whitney Canada
- Procter & Gamble Mfg. Co.
- QuikTrip Corporation
- Raytheon
- Rockwell Automation
- RR Donnelly
- Sanofi-Aventis
- Shaw Industries, Inc.
- Shell Global Solutions
- Sherwin-Williams
- Sikorsky Aircraft Corporation
- Standard Motor Products, Inc.
- Subaru of Indiana Automotive, Inc
- Sunoco, Inc.
- The Dow Chemical
- Towson University
- Toyota
- Tropicana Products, Inc.
- U.S. Steel
- Unilever
- United Technologies
- US DOE
- US EPA
- US Steel
- Vought Aircraft
- Wal-Mart
- Walt Disney
- Weyerhaeuser Company
- Whirlpool
- Wyeth
- Xerox
- Yum! Brands, Inc.

**Find A CEM Near You**  
AEE Certified Professionals Directory



## Certified Energy Manager® Training Program

*A Certified Energy Manager (CEM®) is an individual who optimizes the energy performance of a facility, building, or industrial plant. The CEM is a systems integrator for electrical, mechanical, process, and building infrastructure, analyzing the optimum solutions to reduce energy consumption using a cost-effective approach. CEM's are often team leaders and help to develop and implement their organizations' energy management strategies.*

### About this Program

AEE's premium training program is recognized across industry for providing energy professionals a holistic "big-picture" view of energy management for non-residential buildings and facilities. Over five days, attendees learn everything they need to know to optimize systems to help reduce costs, improve profits, and increase occupant satisfaction.

### What You Will Learn

- Learn energy management from a global perspective, but also understand applicable codes, standards, and policies for your region or country.
- Learn how systems and energy-saving technologies can be used throughout a building, such as HVAC, lighting, motors, boilers, energy storage, CHP, etc.
- Learn how energy management strategies and practices, such as energy audits, or M&V, can help identify energy savings and reduce costs.
- Understand the economic aspects of energy management that you need to know for procurement, supply, and project financing.

### At-a-Glance

- » This training program prepares attendees to take the Certified Energy Manager® (CEM®) exam.
- » This program is held over 5 days.
- » You earn 3.3 CEU | 33 PDH | 6.6 AEE Credits for completing this program.

### Key Takeaways

- » Work through practical examples to demonstrate the topics and procedures covered.
- » Review the various areas of the Body of Knowledge associated with AEE's certification exam.
- » Discuss one-on-one with an instructor how to apply what you have learned to your business and applications to improve profitability.
- » Leave with a course workbook that will become an invaluable desk reference.

### Registration

Candidates should contact their local AEE approved training provider for information about available training programs, the certification application process, exam registration, and associated fees. To find your local training provider visit

[aeecenter.org/training](http://aeecenter.org/training)



# Certified Energy Manager®

## Training Program

### Who Should Attend?

This course is designed to help energy professionals, including energy managers, energy engineers, facility and business managers, industrial engineers, supply chain professionals, utility officials, consultants, contractors, financial officers, and energy service company professionals become more aware of and effective at identifying and implementing the best energy management strategies. This mix of energy professionals and the learning environment also provides attendees an excellent opportunity for peer-to-peer learning and networking.

### Course Outline

- Why Energy Management is Important
- Energy Basics
- Fuel Supply and Pricing
- Energy Audits and Instrumentation
- Codes and Standards
- High Performance Green Buildings
- Energy Accounting and Economics
- Electrical Power Systems
- Motors and Drives
- Lighting Systems
- Maintenance and Commissioning
- HVAC Systems
- Building Envelope
- Building Automation and Control Systems
- Thermal Energy Storage Systems
- Boiler and Steam Systems
- CHP Systems and Renewable Energy
- Industrial Systems
- Energy Savings Performance Contracting
- Energy Savings Measurement and Verification

### Our Instructors

The CEM multi-day program is taught by approved instructors with extensive 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.

### Certification Eligibility

The prerequisites to qualify for the certification process take into account the diverse education and experience applicants may have. Each candidate must meet the required criteria at

[aeecenter.org/cem](http://aeecenter.org/cem)

### Global Training Programs

For a complete list of AEE training programs delivered globally visit

[education.aeecenter.org/global](http://education.aeecenter.org/global)

### Accreditation and Recognition

The Certified Energy Manager (CEM®) accreditation 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. For a full list of organizations that have recognized or accredited the CEM® program visit

[aeecenter.org/cem](http://aeecenter.org/cem)

# 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 and Application
- Comparing Energy vs. Power

##### Fuel Supply and Pricing

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

##### Energy Audits and Instrumentation

- Energy Programs (ISO 50001, DOE and 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 and Federal Building Energy Codes
- Ability to Estimate Minimum Air Flow Requirements (Ventilation Rate Procedure)

##### High Performance Green Buildings

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

#### Day 2

##### Energy Accounting and Economics

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

##### Electrical Power Systems

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

##### Motors and Drives

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

##### Lighting Systems

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

##### Maintenance and Commissioning

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

**Continued on next page...**

# Certified Energy Manager®

## Training Program

### Daily Agenda Continued

#### Day 3

##### HVAC Systems

- Types and Functions of HVAC Systems
- Vapor Compression Cycle, COP, EER, SEER, IPLV
- HVAC Energy Efficiency Measures
- Distribution Systems
- Psychrometric Chart and Processes
- Sensible and 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 and Safety for Various Energy-Related Systems
- PID Algorithms
- Basic Control Terminology
- Automation Systems Interoperability and IoT
- Current Technologies and Hardware and Energy Savings Strategies

##### Thermal Energy Storage Systems

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

#### Day 4

##### Boiler and Steam Systems

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

##### CHP Systems and Renewable Energy (Combined Heat and Power)

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

##### Industrial Systems

- Savings Estimates for Pumps, Compressed Air Systems and Waste Heat Recovery
- Pumps: Pump Curves and 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

## Preparatory Courses and Certification Examinations for the Certified Energy Manager

Locations in India (<https://www.aeecenter.org/certifications/certifications/certified-energy-manager>) Organized by AEE Kolkata Chapter, IISWBM

### REGISTRATION

Updates on Course schedules, venue, dates, eligibility, contact for details and registration information are available at: <https://www.aeecenter.org/certifications> and [www.iiswbm.edu](http://www.iiswbm.edu). Before submitting fees, you are advised to check your eligibility and availability of seat by sending the filled-up application in excel application form via Emails to [aaecourses@iiswbm.edu](mailto:aeecourses@iiswbm.edu) and [aaecourseswithiiswbm@gmail.com](mailto:aaecourseswithiiswbm@gmail.com). Excel application form can be available at [www.iiswbm.edu](http://www.iiswbm.edu) and also be received, if interested in CEA/CEM/any other available courses of AEE, by enrolling name at <https://forms.gle/kfs6AYyBUizum3PA8>

### INDICATIVE INFORMATION: DATES, FEES and PROCEDURE

If those who are eligible, in terms of educational qualification, to take the exam but do not meet the experience requirement, on the date of application for CEM, receive a passing score, they can still earn the Energy Manager In Training (EMIT) certification. Then they have up to six years to gain the number of years of experience needed based on their education level (see eligibility requirements for CEM & EMIT).

Email your queries to [aaecourses@iiswbm.edu](mailto:aaecourses@iiswbm.edu) and [aaecourseswithiiswbm@gmail.com](mailto:aaecourseswithiiswbm@gmail.com) and/or WhatsApp/SMS +91 9433719779/9123395598.

Last date of submission of filled-up application form along with fees	August 25, 2022
Email of Admit E-Card to Eligible Candidates	September 5, 2022
Conduction of online CEM International training by IISWBM	September 12-16, 2022
Conduction of online examination by AEE	September 17, 2022
Declaration of Examination Result on or before	December 16, 2022

Prior to sitting for the exam, each candidate must complete an application.

#CEM Training would be optional for the following candidates:

- Candidate possessing CEA or CEM certification from Bureau of Energy Efficiency (BEE), Government of India
- Candidate completed MBA-PS degree OR Master in Public Systems Management (MPSM) with specialization in Energy Management OR Post-Graduate Diploma in Energy Management (Approved by AICTE) from IISWBM-University of Calcutta.

The CEM exam will be administered at the close of instruction on day four to those, with requisite experience and degree from an (AICTE/UGC/AIU/Such Body) accredited university or college, who has qualified in advance to sit for the exam by submitting a completed CEM application and fee.





Fees for the Training Seminar (in INR)*	50000
Fees for the Examination (in INR)*	40000

\*Add GST 18%. Discount of up to 5% applicable to active AEE members recommended by the applicant's AEE Chapter President/Vice-President

SI CEM Study Guide available at <https://www.aeecenter.org/certifications/resources/cem-resources>

Many other sources useful to prepare for CEM are also available in the said link. AEE Book also may be available at cost with the AEE Chapter.

## COURSE INSTRUCTORS FOR CEA AND/OR CEM INTERNATIONAL\*

	Dr. Binoy K Choudhury, B.E., CEA & CEM (AEE, USA) Trainer, A.E.A.(BEE, Govt. of India) is Professor in Energy Management, IISWBM and Guest Faculty member at IIST and Kalyani University. Earned experience/training in Germany, Japan, United Nations, Thailand, UK, & USA. About 30 years of experience in Energy Field (academics and industry). Email: <a href="mailto:bkchoudhury@iiswbm.edu">bkchoudhury@iiswbm.edu</a>		Mr. SomDerashri, BE (Chem)-BITS, Pilani & PG in Industrial Engg. CEM (AEE, USA) Trainer, A.E.A.(BEE, Govt. of India), Certified Lead Auditor for ISO 50001 (BSI, UK), CMVP (AEE & EVO, USA), Over 25 years of industrial experience & completed over 500 Energy Audits in India & Abroad. Launched many innovative energy saving products. Email: <a href="mailto:som_derashri@rediffmail.com">som_derashri@rediffmail.com</a>
	Mr. Vinay Gadikaris is an accomplished energy professional working in the field of energy efficiency and renewable energy for more than 10 years. He is CEM (AEE, USA) Trainer; CEA (BEE, Govt. of India); Lead Auditor for EnMS ISO 50001 (IRCA). He has worked in Process Industries, DCs, Commercial Establishments. Email: <a href="mailto:vinaygenery@gmail.com">vinaygenery@gmail.com</a>		Mr. Benet George V is an internationally experienced energy professional and done hundreds of energy audits, related projects and training in 11 countries. His certifications include CEM (AEE, USA) Trainer, CMVP (AEE & EVO, USA), PMP (PMI, USA), AEA (BEE, Govt. of India), ISO 50001 Lead Auditor and ZED Assessor. Email: <a href="mailto:benet.george@gmail.com">benet.george@gmail.com</a>

Persons having institutional queries may contact Prof (Dr) Krishna M Agrawal, the Certification Administrator Email: [aaecourseswithiiswbm@gmail.com](mailto:aaecourseswithiiswbm@gmail.com) and [kmaiiiswbm@gmail.com](mailto:kmaiiiswbm@gmail.com) \*Trainers would be available based on need and convenience.

The Director of IISWBM & President of AEE Kolkata Chapter : Mr Dipankar Dasgupta (Email: [ddg\\_director@iiswbm.edu](mailto:ddg_director@iiswbm.edu));

The Presidents of the supporting AEE Chapters are: Mr Dalip Singh, AEE Delhi Chapter (Email: [dschahar@gmail.com](mailto:dschahar@gmail.com)) and Mr Milind Rajendra Chittawar, AEE Western India Chapter (Email: [milind.chittawar@seetechnsolutions.in](mailto:milind.chittawar@seetechnsolutions.in))

Submission of Application: Use format of available file given in <http://www.iiswbm.edu/WebPages/PublicPages/SeminarAndWorkshop/CEACEMo.aspx> to apply through Emails to [aaecourses@iiswbm.edu](mailto:aaecourses@iiswbm.edu) as well as [aaecourseswithiiswbm@gmail.com](mailto:aaecourseswithiiswbm@gmail.com) and copy to [fo@iiswbm.edu](mailto:fo@iiswbm.edu) within stipulated date, and also hard copy may be sent by post at the cost of and responsibility of the interested candidate with Name(s), Qualifications & Experience (enclose supporting document), Address for Communications (with mobile number and Email), and other information as per Application Format with PP size Photo, and proof of online payment made by the stipulated date. Please note the Bank details for NEFT/RTGS Transfer: Beneficiary: IISWBM, Name of Bank: State Bank of India, Surya Sen Street Branch, Kolkata, ACCOUNT NO.:10252384198, IFS Code: SBIN 0003496; SWIFT Code: SBININBB492, MICR Code: 700002099 and PAN : AAAT13215M, IISWBM'S GSTIN # 19AAAT13215M2ZJ and accounting head 9992 for 18 % GST.

*Rise to the Top of the Energy Management Profession: Become AEE Certified*