



## Certified Industrial Energy Professional Training Program™

### About This Program

AEE's training program, recently updated in 2020, is recognized across industry for providing business professionals responsible for energy or utility operations in industrial settings with the knowledge and tools they need to manage these systems more effectively. Over three days, attendees learn everything they need to know about industrial energy strategies for reducing costs and optimizing systems performance.

### What You Will Learn

- Energy management from an industrial and manufacturing perspective.
- How the latest industrial processes, systems and technologies can be leveraged for optimizing systems performance, improve energy efficiency and help reduce energy use.
- How energy management systems (ISO50001) and energy audits processes (ISO50002), can help identify energy savings and reduce costs in industrial environments.
- The economic aspects of energy management you need to know to successfully fund energy reduction projects.

### At-a-Glance

- » This training program prepares attendees to take the Certified Industrial Energy Professional (CIEP™) exam.
- » This program is held over 3 days.
- » You earn 2.4 CEU | 24 PDH | 4.8 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 visit the website for additional information on available training courses, certification application process, exam registration, and associated fees. Visit [aee.org/training](https://aee.org/training)



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## 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, consultants, and contractors become more aware of and effective at identifying and implementing the best energy management strategies in industrial plants and manufacturing facilities.

## Course Outline

- Introduction to CIEP Program/Goals
- Fundamentals to Industrial Energy Audits and Energy Management Systems
- Instrumentation and Controls
- Energy Investigation Support Tools
- Fuels, Furnaces, and Fired Equipment Basics
- Plant Water Systems
- Heat Exchange Systems
- Boilers and Steam Systems
- Electric Motors and Drives
- Pump Systems
- Fan Systems
- Compressed Air Systems

## Our Instructors

This 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 professional needs to know.

## 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/ciep](https://aeecenter.org/ciep)

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## Detailed Agenda

### Intro to CIEP™ Program/Goals

#### Fundamentals to Industrial Energy Audits and Energy Management Systems

- Objectives of energy management
- Fundamentals to Energy
- Energy Efficiency
- Energy Balance
- Need and types of energy audit
- ISO50002 Energy Audit Process Overview
- ISO50001 Energy management systems

#### Instrumentation and Controls

- The basic process and concepts of control systems
- Types of control systems
- Field input elements
- Field output elements
- Control valves
- Basic and advanced control technologies
- EEM's to enhance instrumentation and control system effectiveness

#### Energy Investigation Support Tools

- Safety
- Electrical metering equipment
- Data loggers
- Combustion metering
- HVAC metering
- Temperature metering
- Pressure metering
- Flow metering (velocity, differential pressure, displacement, open flow)
- Solar PV metering
- Instrumentation & control fundamentals

#### Fuels, Furnaces, and Fired Equipment Basics

- Fuel types
- Furnaces and furnace efficiency
- Heat Transfer
- Fired heaters
- Thermal oxidisers
- Burners, Fuel trains, & Flame stability
- Combustion and thermal efficiency
- Flaring
- Energy efficiency measures

### Plant Water Systems

- Water Context & Water Balance
- Cooling towers
- Steam systems
- Water Treatment
- Industrial water uses (Oil & gas, food & beverage, mining, construction, forestry, pulp & paper)
- Water efficiency measures

### MHeat Exchange Systems

- Heat exchanger basics
- Main types of heat exchangers in use
- Cooling towers (heat rejection machines)
- Fouling issues
- Energy efficiency measures

### Boilers and Steam Systems

- Fundamentals to steam systems (types, steam properties)
- Water treatment and boiler blowdown
- Deaerators
- Combustion efficiency
- Determining and improving boiler efficiency
- Distribution (Piping, pressure reducing stations, flash steam)
- Insulation
- End use & cogeneration
- Condensate recovery & steam traps
- Energy efficiency measures

### Electric Motors and Drives

- Electric Fundamentals (induction, powerfactor, affinity laws)
- Electric motor fundamentals
- Electric motor construction and components
- Understanding electric motor nameplate data (Frame size, kW, class, SF, Volt, etc.)
- Motor efficiency
- Speed control
- Energy Efficiency measures

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## **Pump Systems**

- Pump system fundamentals
- Pump Classification and types
- Pump system components (impellers, casings, bearings, seals, piping, controls)
- Total head, friction head, static head, velocity head, NPSH
- Calculating delivered power, total head and efficiency of a pump
- Determining the pipe losses frictional head of a pumping system
- Pump cavitation and remedies of prevention
- Pump and system performance curves
- Series & parallel pumping
- Pump maintenance and reliability aspects
- Energy efficiency measures

## **Fan Systems**

- Fan system fundamentals
- Fan types and its applications
- Fan and system performance curves
- Fan controls and its impact on performance curves and efficiencies
- Fan maintenance
- Energy efficiency measures

## **Compressed Air Systems**

- Compressed Air Systems
- Compressed air fundamentals
- Compressor types (rotary screw, centrifugal, reciprocating piston)
- Flow capacity control
- Multiple compressor control
- Pressure profile
- Compressor operating conditions
- Treatment (dryers & filters)
- Receiver storage volume and calculations
- Distribution
- End use (leaks, inappropriate use, artificial demand)
- Energy efficiency measures