



Certified Industrial Energy Professional™ Training Program

The ideal candidate for the Certified Industrial Energy Professional (CIEP) Training Program is an Industrial Energy Professional who engages in or manages components of utility operations.

About This Program

AEE's CIEP training program, recently updated in 2024, is recognized across industry for providing energy professionals responsible for energy or utility operations in industrial settings with the knowledge and tools they need to manage these systems more effectively. Over four days, attendees learn everything they need to know about industrial energy strategies for reducing costs and optimizing systems performance.

What You Will Learn

After the Certified Industrial Energy Professional Training Program, you will have a solid understanding of key principles:

- 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.
- More than 250 Energy Efficiency Measures (EEM's); many of them low cost/no cost to provide immediate value.
- Much more practical detail and content pertaining the significant energy uses you will find in industry (e.g. furnaces, heat exchangers, turbines, fan -, steam -, motor -, pump -, compressed air -systems, etc.)
- Includes more practical examples and practical experiences, enabling you to add tangible value in the real world.

At-a-Glance

- » This training program prepares attendees to take the Certified Industrial Energy Professional (CIEP™) exam.
- » This course is held over 4 days.
- » You earn 3.2 CEU | 32 PDH | 6.4 AEE Credits for completing this program.

Key Takeaways

- » **Confidence!** You will participate in activities geared towards applying what you learned using practical examples that demonstrate your understanding of the topics and procedures covered.
- » **Knowledge!** You will receive a high-level overview of the Body of Knowledge associated with AEE's certification exam.
- » **Application!** You will interact with professionals and subject matter experts who can guide you through discussions on how to apply what you learned.
- » **Resources!** You will receive a course workbook and ready reference materials.

Certification, examination and quality control by:
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IEPA represents the international certification body the Association of Energy Engineers (AEE) in the Sub-Sahara Africa region.

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 effective and aware of identifying and implementing the best energy management strategies in industrial plants and manufacturing facilities.

Course Outline

- Introduction to CIEP Program/Goals
- Introduction to Industrial Energy Management
- Controls Systems
- Audit Tools
- Industrial Water Systems
- Heat Exchange Systems
- Industrial Refrigeration Systems
- Furnaces, Boilers, and Fired Equipment
- Steam Systems
- Turbine Systems
- Motors Systems
- Pump Systems
- Fan Systems
- Compressed Air Systems

Our Instructors



Albert Williams

CEM[®], CEA[™], CIEP[™], CMVP[®], CRM[™], REP[™], BEP[™], UNIDO International Energy Expert (Compressed Air, Pumps, Steam)

Albert is a contributing developer and trainer of the following courses:

CEM[®] (Certified Energy Manager), CEA[™] (Certified Energy Auditor), CIEP[™] (Certified Industrial Energy Professional), UNIDO expert and user level CASO, Certified Energy Audit Professional (EAP), Energy Efficiency in Water & Wastewater Utilities (for the Balkans region), Energy Systems Optimization Expert (for Pakistan), Energy Conservation for the Technical Industrial Workforce (for Pakistan), Energy Efficiency Fundamentals (for Nigeria), Energy Audit Technician (for sub-Saharan Africa), Energy Auditing Fundamentals (for Seychelles), Basic Principles of Energy (for South Africa)

He is also a trainer of the following courses: UNIDO Pump Systems Optimization user level, Introduction to Energy Management Training (IEMT), ISO 50001 Energy Management System Implementation, Energy Management 101, M.Eng. Mech. (MEGI 878) energy management module

Albert is regularly contracted internationally by: AEE[®] (USA based) - instructor, developer; United Nations (UNIDO) - CASO expert, trainer, developer; Canadian Institute for Energy Training (CIET) and Econoler - technical expert, developer, trainer; Institute of Energy Professionals Africa (IEPA) trainer, developer; Danish Energy Management (DEM) - energy expert, trainer, NCPC - energy auditor, trainer.

Certification Eligibility

The prerequisites to qualify for the certification process consider the diverse education and experience applicants may have. Each candidate must meet the required criteria at [Certified Industrial Energy Professional - CIEP[™]](#)

Global Training Partners

For a complete list of AEE training partners visit: [Approved AEE Training Partners Worldwide | AEE[®] \(aeecenter.org\)](#)

Detailed Agenda

Intro to CIEP[™] Program

Basic Industrial Energy Concepts

Introduction to Industrial Energy Management

- Objectives of energy management
- Climate change & clean energy
- The need for industrial energy management
- Energy basics
- Energy systems efficiency
- Energy balance
- Sensible and latent heat transfer
- Energy audit types and ISO50002
- ISO50001 energy management systems standard
- Relevant driving variable(s) identification through regression analysis
- Baseline and energy performance indicators development

Control Systems

- Basic process and concepts of control systems
- Types of control systems
- Field input elements (thermocouples, RTD's, transmitters, transducers)
- Field output elements (control valves, actuators, relays)
- Control algorithms, and control technologies
- Energy Information Systems (EIS)

Audit Tools

- Industrial safety
- Electrical metering equipment and data loggers
- Combustion metering
- Rotor and vibration metering
- Temperature metering
- Compressed air leak detection
- Pressure metering
- Flow metering (velocity, differential pressure, displacement, open flow)
- Solar PV and other commercial building metering

Industrial Water Systems

- Water context and the need for water treatment
- Industrial water uses (Oil & gas, food & beverage, mining, construction, forestry, pulp & paper, desalination)
- Basics and types of water treatment
- Reverse osmosis system basics
- Cooling towers and its associated water loss
- Ion exchange, hardness, and blowdown in steam systems

Thermal Systems

Heat exchange systems

- Heat exchanger basics and design
- Main heat exchangers types used in industry and its applications
- Heat exchange fouling
- Heat exchangers in boiler systems
- Heat exchangers in buildings
- Heat rejection and approach temperatures in cooling towers

Industrial Refrigeration Systems

- Refrigerants and its impact
- Basic refrigeration cycle
- Complex industrial refrigeration systems (single stage, multistage, cascade, liquid overfeed, absorption)
- Types of refrigeration equipment
- System efficiency metrics

Furnaces, Boilers, and Fired Equipment

- Fuel types and heating values
- Furnace types
- Furnace efficiency
- Fired heater construction and components
- Boiler types and operation
- Fuel train, construction, function, and firing rate control
- Burner systems, mix design styles, flames, and combustion
- Flaring

Steam Systems

- Steam properties and use saturated and superheated steam tables
- Boiler efficiency (direct & indirect method)
- Boiler losses (shell, blowdown, stack)
- Common methods to reduce Stack Temperature Rise
- Deaerator tanks
- Distribution system (steam leaks, piping, insulation)
- End use (steam traps, condensate return, flash steam).

Rotating Equipment Systems

Turbine Systems

- Steam turbines and gas turbines
- The Rankine cycle, the Brayton cycle, and the combined-cycle
- Combustion chambers, turbine blades and nozzles, seals and glands
- Turbine design, steam flow, and blade types
- Turbine maintenance and control optimization
- CHP technologies
- Conventional power stations, renewable energy, distributed generation, and smart grids integration

Motor Systems

- Electrical fundamentals (induction, electromagnets, power factor)
- Electric motor basics, types, construction, causes of failure
- Electric motor nameplate data (Frame size, kW, insulation class, SF, Volt, etc.)
- Motor efficiency and efficiency classes
- Losses in motors
- Motor drives and speed control
- Transmission types (gears, belts)

Pump Systems

- Pump components and pump type classifications
- Impellers, seals, bearings, couplings
- Delivered power, total head and efficiency of a pump
- Total head, friction head, static head, velocity head
- Distribution losses
- Pump and system performance curves
- Speed changes
- Pumps in series and in parallel
- Pump cavitation, its causes, and remedies
- Net Positive Suction Head available
- Pump maintenance and reliability aspects

Fan Systems

- Fan system fundamentals and components
- Fan types and their various applications considering impeller efficiency and dust loading
- Fan and system performance curves
- Fan controls methods (dampers, inlet louvre dampers, variable inlet vanes, variable speed)
- Effect of variable flow by using the fan laws or affinity laws
- Fan maintenance practices

Compressed air systems

- Compressed air system fundamentals
- Heat recovery and compressor operating conditions
- Compressor types (reciprocating, rotary vane, screw, axial, centrifugal)
- Load control and its application on screw and centrifugal compressors
- Air treatment (condensate, drains, dryers, filters)
- Air distribution (piping, storage tanks)
- Leaks and leakage quantification tests
- Artificial demand
- Inappropriate use

IEPA is the proud Training Partner of the Association of Energy Engineers for the Sub-Saharan Africa Region:



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Training Service Providers for IEPA in Sub-Sahara Africa:



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In Process: Tanzania

IEPA supports the following AEE Chapters:

