International Version
Sub-Sahara Africa

Association of Energy Engineers

Certified Energy Auditor™
Training Program

Energy Auditors undertake energy efficiency assessments of commercial and industrial facility's energy systems. Their audits cover building occupancy, operations, maintenance, and code compliance. An auditor aims to provide their client with detailed survey results, risk mitigation analysis, implementation plans, and a final investment-grade analysis.

About This Program

This training program is designed to provide attendees an in-depth and technical review of energy auditing. Over three days, our professional instructors will guide you through the essential steps necessary to evaluate facility energy systems from preliminary surveys through ASHRAE® Level 3 Energy Audits, ISO 5002 audits and how to analyze the results and deliver them to your client.

What You Will Learn

- Pre-audit requirements to ensure accurate data collection, measurement and verification
- What you need to know when conducting audits of building equipment and systems, such as lighting, pumps, motors, drives, HVAC, water systems, etc.
- The financial and economic aspects of an energy audit and how they can affect the bottom line for an organization.
- How to analyze utilities, and how energy demand, energy rates, energy accounting and performance contracting all affect an energy audit
- How to identify the "low-hanging fruit" that is ripe for energy conservation opportunities

At-a-Glance

» This training program prepares attendees to take the Certified Energy Auditor® (CEA®) exam.

» This program is held over 4 days, with a voluntary exam on day 5.

» You earn 2.2 CEU | 22 PDH | 4.4 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 how to apply what you have learned to your business and applications.

» Leave with a course workbook that will become an invaluable desk reference.

Registration

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Represented in Sub-Sahara Africa by IEPA INSTITUTE OF ENERGY PROFESSIONALS AFRICA NPC

cea™

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Who Should Attend

The program is of most significant value to those undertaking or assessing energy auditing projects. Obtaining AEE's CEA™ certification provides international credibility among energy management, sustainable and clean energy communities. Attendees of this program have included existing energy professionals, energy engineers, energy managers, facilities managers, and energy consultants.

Course Outline

- Energy Auditing Overview (Industrial and Residential)
- ASHRAE® Level I Walk-through Audit
- AHRAE® Type II & III Audits
- ISO5002 Energy Audits
- Auditing Tools and Software
- Investment Grade Audits
- Calculations to Determine Usage
- Building Envelopes
- Energy Conservation Measures
- Energy Fundamentals and Power Factor
- Facility Systems and Lighting
- HVAC and Chillers
- Motors, Drives and Driven Loads
- Boilers, Compressed Air and Industrial Processes
- Domestic Hot Water and Service Hot Water
- Water Efficiency and Conservation
- Operations and Maintenance Considerations
- Project Financing
- Audit Reports

Sub-Sahara Africa Calendar

South Africa, Pretoria:
20-23 April, exam 24 April 2020

Kenya, Nairobi:
25-28 August, exam 31 August 2020

Mauritius, Quatre Bornes:
07-10 September 2020, exam 11 Septmber 2020

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/cea

CURRENT QUALIFICATION		EXPERIENCE
4-year engineering/architectural degree OR Pr.Eng, Registered Architect	PLUS	+3 years
4-year degree in technology, environmental science, physics or earth science		+3 years
3-year technical qualification		+5 years
4-year degree in business or business related		+4 years
4-year unrelated degree		+4 years
2-year associate degree		+5 years
NONE: no current qualification		+10 years
Current status of CEM		+3 years
Current status of CBEP		n/a
Employment at company in related field		n/a
Years of work experience required - in addition to the current qualification - must be related to the certification discipline applied for.		

Certification, exams and quality control by:
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Training hosted by:

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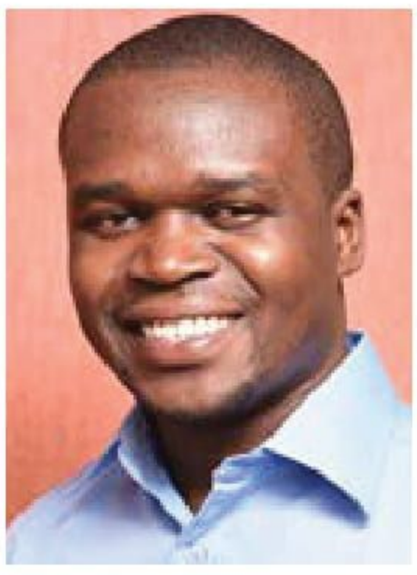
Our Instructors

Each member of our team of professional instructors provides their own experience and focuses on specific areas essential to energy auditing. Their combined teaching and industry experience allows them to deliver information that is of the most relevance and practical value to attendees.

Louis Lagrange
MSc Agricultural Engineering, CEM®, CEA®, CMVP®, CWEP®, CBEP®

Albert Williams
B.Eng (Industrial), CEM®, CEA®, CMVP®, UNIDO Compressed Air Expert

Chris Mbori
MSc Energy Management, CEM®, CMVP®, CEA®, CWEP®, REP®, ISO50001 Lead Certification



Daily Agenda

Day 1

Energy Auditing Overview
- Introduction to Energy Auditor Skills
- Common Audit Shortcomings
- The Need for Certified Energy Auditors

Energy Fundamentals
- Energy and Power
- Forms of Energy
- Unit Conversions
- Energy Bill Components
- Point of Use Cost

Audit Process
- Energy Balance
- Benchmarking Analysis
- Level 0 - Preliminary Energy Use Analysis
- ASHRAE Level 1, 2 and 3 Audits
- Investment Grade Audit Basics
- Investment Grade Audit Contract
- Other Type of Audits
- Data Collection Forms

Auditing Tools and Computer Software
- Safety Considerations
- Energy Audit Instrumentation
- Metering and Sub-Metering
- Free and Proprietary Software Tools (EZSim, HAP, Energy Plus, MotorMaster+, QuickCalc, RETScreen)

Day 2

Understanding Electrical Energy Systems
- Dc, Ac, Single & 3-Phase Power
- Star and Delta Connections
- Resistive and Inductive Loads
- Power Factor and Power Factor Correction
- Electric Motors
- Voltage Imbalance
- Energy Efficient Motors
- Variable Speed Drives
- Harmonics
- Single Phase Motors
- Lighting
- Lighting Quality and Lighting Quantity Considerations
- Types of Light Sources

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Daily Agenda Continued

- Ballasts
- Lighting Maintenance
- Lighting Control

Understanding Thermal Systems

- Heat Transfer
- Heat Flow Calculations
- Degree-Days
- Insulation
- The Psychrometric Chart
- Refrigeration
- The Vapour Compression Cycle
- Pressure Enthalpy Diagram
- HVAC Performance Measures
- Absorption Chillers
- Air Conditioning System Types
- Boilers and Steam Systems
- Boiler Fuel Types
- Boiler Types
- Combustion Efficiency
- Steam Leaks
- Heat Recovery

Understanding Mechanical Energy Systems

- Affinity Laws
- Pump Systems
- Pump and System Curves
- Gas-Engine Driven Chillers
- Compressed Air Systems
- Components (After-Coolers, Receivers, Dryers, Distribution, Condensate Drain Traps)
- Artificial Demand
- Compressed Air Leakages
- Multiple Compressor Control
- Transport Energy
- Transport Energy Improvement Opportunities

Day 3

Economic Analysis and Economic Decisions for Energy Projects

- Economic Analysis (Simple Payback, MARR, NPV, IIR, SIR, Present Worth)
- Life Cycle Costing
- Economic Examples and Problems
- Case Studies

Controls and Web-Based Energy Information Systems

- Types of Controls
- Control Technologies
- Control Algorithms
- Building Management Systems
- DDC Control
- Building EIS
- Building Automation Systems
- Maintenance and Commissioning

Data Analysis

- Fixed Versus Variable Energy Use
- Regression Analysis
- Drivers of Energy Use
- CUSUM

Day 4

Assessment of Performance

- Energy Performance
- Energy Performance Indicator (ENPI)
- Current Consumption, Efficiency, and End Use
- Significant Energy Use (SEU)

Alternative Financing and Measurement and Verification (M&V)

- Energy Management Project Financing Options
- Energy Saving Performance Contracting (ESPC)
- M&V Process
- IPMVP
- M&V Measurement Methods
- Baseline Adjustments
- Routine and Non-Routine Adjustments

Management of The Audit Process

- Resources, Competence, Time Management, Communications

Writing Successful Audit Reports

- Report Structure
- Techniques for Effective Report-Writing
- Presenting The Report