



Body of Knowledge

The 50001 CP EnMS certification consists of two (2) separate exams:

- Core1 – includes topics on energy, energy efficiency, and statistics.
- Core2 – includes topics on ISO 50001 EnMS concepts, business decision making, and internal audit.

These exams may be taken in any order. Core 1 and Core 2 exams will be 2.5 hours each.

The following tables contain the body of knowledge separated by exam:

Core 1: Energy, Energy Efficiency & Statistics	Domain Weight
Energy Fundamentals	15%
Understanding Energy Sources and Demand Characteristics	10%
Energy Problem Solving Skills	5%
Operating Characteristics of Basic Key Energy Using Systems	10%
Renewables	5%
Fundamentals of Energy Project Management - for Developing Action Plans	5%
Data Collection and Use	5%
Fundamentals of Business Decision Making	7%
Models	8%
Instrumentation & Controls	5%
Energy as Related to Management Systems	15%
Statistics	10%
Total:	100%

Core 2: Energy Management Systems	Domain Weight
Understanding ISO 50001 Energy Management System Concepts	45%
Management Systems	45%
Internal Audit	10%
Total:	100%

The following section includes the detailed body of knowledge covered on the 50001 CP EnMS exams:

Core 1: Energy, Energy Efficiency & Statistics
Energy Fundamentals <ul style="list-style-type: none">• Definitions of energy, power, 1st law of thermodynamics• Conservation of energy, mass, momentum• Commonly used units of measure• Conversion of units of measure• Consistency of units – (e.g., kilowatt vs. kwh)• Seasonal effects on energy use• Future energy use estimation• Equalization of energy units for operations• Energy bills – how to read• Impact of weather on energy use• Diminishing returns for audit detail• Intensity of energy use
Understanding Energy Sources and Demand Characteristics <ul style="list-style-type: none">• Basics of electricity generation and line losses• Characteristics of natural gas, biofuels, and other common fuel sources• Conversion to source fuel (site vs. source)• Understanding demand charges• Energy demand versus total energy consumed• Facility energy consumption
Energy Problem Solving Skills <ul style="list-style-type: none">• Skills needed to approach an unfamiliar system• Risk assessment and energy planning• Attribute energy use appropriately
Operating Characteristics of Basic Key Energy Using Systems <ul style="list-style-type: none">• Fuel-fired heating systems• HVACR systems• Lighting• Building envelope
Renewables <ul style="list-style-type: none">• Incorporating renewables• Justifying use of renewables / alternative sources
Fundamentals of Energy Project Management - for Developing Action Plans <ul style="list-style-type: none">• Schedule• Tasks

Core 1: Energy, Energy Efficiency & Statistics

- Resources
- Interactions
- Goals / outcomes
- Estimation of energy savings

Data Collection and Use

- Energy data reliability – accuracy, precision, repeatability
- Data integration and reconciliation
- Understanding calibration and its contribution to data accuracy
- Continuous and periodic monitoring

Fundamentals of Business Decision Making

- Internal rate of return
- Time value of money
- Opportunity cost
- Lifecycle cost
- Basic Enterprise Resource Planning (ERP)
- Translation from operational language to management terms

Models

- Basic statistics (linear models vs. non-linear models)
- Cumulative sum control chart (CUSUM) statistical process control technique
- Basic understanding of process models
- Identifying model inputs and outputs
- Consistency between inputs and outputs in models
- Equations and statistical programs/applications
- Relationship between components and system

Instrumentation & Controls

- Types of controls
- How instrumentation and controls are used

Energy as Related to Management Systems

- Establish and conduct an energy review
- Identify all energy sources
- Identify energy uses and consumption
- Identify significant energy uses
- Identify opportunities for energy performance improvement
- Determine and develop criteria for the effective operation and maintenance of significant energy uses that supports energy performance improvement
- Establish methods for evaluation of performance improvement opportunities to consider when planning new, modified or renovated equipment, facilities, processes and systems that can have an impact on energy performance

Core 1: Energy, Energy Efficiency & Statistics

- Establish a system for the organization to monitor and measure outputs of the energy review: significant energy uses, relationship between significant energy use and consumption, relevant variables, EnPIs, and the effectiveness of action plans in achieving objectives and targets
- Evaluate a site for conformance with energy planning requirement
- Use an energy baseline as a point of comparison

Statistics

- Identify independent linear variables
- Test for linearity
- Interpret significance using p-values (as relating to linear regression)
- Develop and analyze an energy model using regression analysis
- Evaluate future energy use and consumption related to operations
- Project energy consumption related to operations

Core 2: Energy Management Systems

Understanding ISO 50001 Energy Management System Concepts

- Document control
- Records
- Management review
- Continuous improvement constructs
- Internal audit / root cause analysis / corrective action
- Management of change
- Leverage management system elements in place
- Alignment of goals within the organization
- Connecting EnPIs and energy objectives with business objectives
- Training and communication systems
- Management system terms
- Energy procurement & energy in design
- Operational controls
- Criteria for effective operation and maintenance of a process
- Organizational structures
- Impact of new processes on energy use and consumption

Management Systems

- Apply energy management systems in the context of ISO 50001
- Determine systems, processes policies and procedures needed to implement and maintain an EnMS for the organization
- Analyze existing systems, processes policies and procedures in the organization regarding energy, including communication
- Perform an ISO 50001 gap assessment

Core 2: Energy Management Systems

- Create an EnMS implementation strategy to address the gaps in the systems, processes, policies and procedures related to ISO 50001
- Create an EnMS implementation strategy to address the gaps in the systems, processes, policies and procedures related to SEP (for requirements above and beyond ISO 50001) and address future updates
- Create a business case to persuade management to act on the recommendations of the implementation strategy for processes, policies, and procedures
- Define scope and boundary of EnMS
- Define roles and responsibilities for EnMS
- Develop an energy policy
- Identify the appropriateness of the energy policy
- Identify legal and other requirements related to energy uses
- Establish objectives, targets and action plans appropriate to the organization's energy performance improvement opportunities
- Monitor progress toward completion of the action plan
- Determine skills needed to implement and maintain an EnMS
- Analyze competence available in the organization regarding energy management
- Create a training plan to fill the gaps in competence
- Determine required and value added documents and records and related controls
- Work with the organization to establish a procurement policy that is evaluated on the basis of energy performance and the criteria for doing so
- Design and direct an internal audit program
- Develop and create a sustainable system for nonconformance, corrective and preventive action
- Integrate EnMS management review into existing management oversight activities

Internal Audit

- Prepare the organization for ISO 50001 3rd-party audit