

Course No. 1575

Energy Efficiency & Conservation Training Course

ENERGY MANAGEMENT & SUSTAINABILITY
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The Energy Efficiency & Conservation Training Course provides a comprehensive and practical framework for improving energy efficiency, reducing unnecessary energy consumption, and establishing sustainable energy conservation practices across industrial, commercial, public-sector, and organizational environments. The course focuses on understanding how energy is consumed, identifying avoidable losses, improving operational and equipment efficiency, and developing structured energy conservation initiatives that support cost reduction, sustainability, reliability, and long-term organizational performance.

Effective energy conservation requires more than reducing energy consumption. It requires organizations to understand the relationship between energy use, production, operating conditions, equipment performance, maintenance, occupancy, process requirements, and business objectives. The course therefore adopts a practical systems-based approach that addresses thermal, electrical, mechanical, and utility energy use while emphasizing improvements that maintain safety, productivity, quality, reliability, and service continuity.

The program covers the major principles and practices of energy efficiency and conservation, including energy assessment, energy balances, energy baselines, energy performance indicators, efficient operation of equipment, utility optimization, thermal efficiency, electrical efficiency, lighting, cooling, heating, motors, pumps, compressors, steam systems, heat exchangers, process systems, and waste heat recovery. Participants will learn how to identify energy-saving opportunities and assess their technical, operational, and economic implications.

A strong emphasis is placed on creating sustainable energy conservation programs rather than implementing isolated efficiency measures. Participants will examine energy management practices, operational discipline, maintenance strategies, behavioral factors, monitoring and measurement, benchmarking, project prioritization, and continuous improvement. The course also addresses how organizations can build accountability for energy performance and integrate conservation objectives into operational planning and management decision making.

Through practical exercises, energy consumption analysis, efficiency assessments, case studies, energy conservation project evaluation, and implementation workshops, the Energy Efficiency & Conservation Training Course develops capabilities that can be applied across government entities, ministries, public-sector organizations, oil and gas facilities, manufacturing plants, utilities,

commercial buildings, infrastructure assets, and large corporations. The course is suitable for executives, managers, engineers, energy professionals, operations teams, maintenance specialists, sustainability professionals, and decision makers.

Objectives

- Analyze the principles of energy efficiency and energy conservation and their contribution to operational and financial performance during the course.
- Develop structured approaches for assessing energy consumption and identifying significant energy-saving opportunities.
- Evaluate thermal, electrical, mechanical, and utility energy systems to determine sources of inefficiency and avoidable losses.
- Apply practical energy conservation techniques to improve equipment, processes, facilities, and operating practices.
- Assess energy performance using energy baselines, performance indicators, consumption trends, and benchmarking methods.
- Design energy-saving measures for motors, pumps, compressors, lighting, cooling, heating, steam, and thermal systems.
- Evaluate waste heat recovery, process optimization, and energy reuse opportunities.
- Analyze the technical, financial, operational, and maintenance implications of proposed energy conservation initiatives.
- Develop prioritized energy efficiency projects based on savings potential, investment, risk, feasibility, and organizational value.
- Strengthen energy monitoring, measurement, reporting, and verification processes.
- Improve integration between energy management, maintenance, operations, asset management, sustainability, finance, and procurement.
- Align energy efficiency and conservation programs with sustainability, cost reduction, operational resilience, and long-term organizational objectives.

Who Should Attend

This course is designed for professionals responsible for energy consumption, efficiency, conservation, facility performance, industrial operations, utilities, maintenance, engineering, and sustainability. It is particularly relevant to Energy Managers, Energy Engineers, Mechanical Engineers, Electrical Engineers, Process Engineers, Facilities Managers, Utilities Managers, Plant

Managers, Operations Managers, Maintenance Managers, Reliability Engineers, Sustainability Specialists, and Energy Analysts.

The program is also suitable for Engineering Directors, Operations Directors, Plant Managers, Asset Managers, Maintenance Directors, Sustainability Managers, Technical Managers, and senior executives responsible for energy costs, operational efficiency, asset performance, sustainability, and capital improvement programs. Professionals working in government entities, ministries, public-sector organizations, oil and gas companies, petrochemical facilities, power and utilities organizations, manufacturing plants, infrastructure organizations, commercial buildings, and large corporations can benefit from the course.

The course is particularly valuable for professionals involved in energy audits, energy monitoring, energy-saving projects, maintenance optimization, utility management, process improvement, equipment selection, capital planning, and sustainability initiatives. It also provides useful knowledge for finance, procurement, project management, and administrative professionals involved in evaluating, funding, or supporting energy conservation programs.

Learning Outcomes

- Explain the principles and business value of energy efficiency and energy conservation.
- Analyze energy consumption patterns and identify significant energy uses and avoidable losses.
- Prepare and interpret basic energy balances for facilities, processes, and equipment.
- Evaluate the efficiency of thermal, electrical, mechanical, and utility systems.
- Identify practical energy-saving opportunities across industrial and commercial operations.
- Apply energy efficiency techniques to motors, pumps, compressors, lighting, heating, cooling, steam, and process systems.
- Assess waste heat recovery and energy reuse opportunities and determine suitable applications.
- Develop energy baselines, energy performance indicators, and monitoring approaches.
- Evaluate the technical and economic feasibility of energy conservation projects.
- Prioritize energy efficiency measures according to energy savings, investment, risk, reliability, and ease of implementation.
- Prepare management reports that communicate energy performance, savings opportunities, project priorities, and expected benefits.

- Develop an integrated energy efficiency and conservation action plan aligned with organizational strategy and sustainability objectives.

Course Outline

DAY 01

Energy Efficiency and Conservation Fundamentals

- Principles and objectives of energy efficiency and energy conservation
- Relationship between energy consumption, operating cost, productivity, and sustainability
- Energy sources and major categories of energy use
- Energy consumption patterns and significant energy users
- Energy balances and identification of energy losses
- Energy baselines and energy performance indicators
- Energy measurement, metering, monitoring, and data quality
- Energy conservation culture and organizational accountability

PRACTICAL APPLICATION

Analyze the energy profile of a representative facility and identify major consumption sources, losses, and initial conservation opportunities

DAY 02

Thermal and Electrical Energy Efficiency

- Principles of thermal energy efficiency
- Boilers, furnaces, and process heating efficiency
- Heat exchangers, insulation, and thermal loss reduction
- Steam generation, distribution, and condensate recovery
- Motors, transformers, and electrical distribution efficiency
- Power factor and electrical loss reduction
- Lighting efficiency and control strategies
- Heating, ventilation, and cooling system efficiency

DAY 02 — CONTINUED

PRACTICAL APPLICATION

Conduct an energy efficiency review of selected thermal and electrical systems and develop practical improvement measures

DAY 03**Mechanical Systems, Utilities and Process Optimization**

- Pump efficiency and flow optimization
- Compressor performance and compressed air efficiency
- Fans, blowers, and auxiliary equipment
- Cooling systems and chilled-water optimization
- Utility system efficiency and operating conditions
- Process optimization and energy-efficient production practices
- Maintenance practices and their influence on energy performance
- Equipment loading, operating schedules, and energy demand management

PRACTICAL APPLICATION

Evaluate mechanical and utility systems and identify opportunities to reduce energy consumption while maintaining operational requirements

DAY 04**Energy Conservation Projects and Economic Evaluation**

- Identifying energy conservation opportunities
- Energy-saving technologies and operational improvement measures
- Waste heat recovery and energy reuse
- Process heat integration and energy optimization
- Estimating energy savings and cost reduction potential
- Capital investment and operating cost considerations
- Economic evaluation and project prioritization
- Technical, operational, reliability, and safety considerations

DAY 04 — CONTINUED

- Measurement and verification of energy savings

PRACTICAL APPLICATION

Develop a portfolio of energy conservation projects and rank initiatives according to savings potential, investment, risk, feasibility, and expected organizational value

DAY 05**Energy Management, Monitoring and Continuous Improvement**

- Developing an integrated energy efficiency and conservation strategy
- Establishing energy targets, baselines, and performance indicators
- Continuous energy monitoring and performance analysis
- Benchmarking and identification of performance gaps
- Integrating energy conservation with maintenance and operations
- Energy reporting, dashboards, and executive communication
- Governance, accountability, and ownership of energy performance
- Change management and development of sustainable energy-saving behavior
- Continuous improvement and periodic review of conservation initiatives

FINAL WORKSHOP

Develop and present a comprehensive Energy Efficiency & Conservation action plan covering energy assessment, major energy users, thermal and electrical efficiency, mechanical and utility optimization, waste heat recovery, project economics, monitoring, measurement and verification, governance, and implementation priorities

Register or Request More Information

Course page: <https://quest-training.com/courses/energy-efficiency-conservation-training-course>

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