# Industrial Energy Efficiency Training Course

Professional Development Training Course Outline

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|---|---|---|---|
| **Category** | Renewable Energy | **Duration** | 5 Days |
| **Base Fee** | $1,500 USD | **Delivery Mode** | Online / On-site Hybrid |

## Course Introduction

Industrial energy efficiency is becoming a strategic priority for organizations seeking to reduce operating costs, strengthen energy productivity, improve resilience, and accelerate industrial decarbonization. Modern energy management is moving beyond traditional audits toward ISO 50001, smart metering, Industrial IoT (IIoT), artificial intelligence, machine learning, predictive analytics, digital twins, and integrated energy-management platforms. Recent research highlights the growing role of AI, IoT, digital twins, and Industry 4.0 in real-time monitoring, optimization, predictive maintenance, renewable-energy integration, and carbon reduction Industrial Energy Efficiency Training Course equips professionals with practical capabilities to identify energy losses, establish meaningful energy performance indicators (EnPIs), evaluate energy-saving opportunities, build business cases, and implement measurable improvement programs across industrial facilities.

The course combines energy auditing, process optimization, energy management systems, smart energy technologies, renewable integration, carbon management, and continuous improvement. Participants learn how to connect technical energy opportunities with financial, operational, and sustainability objectives. Current industrial practice increasingly emphasizes integrated approaches combining Lean, ISO 50001, Industry 4.0 analytics, AI, and digitalization, while digital-twin research demonstrates potential for simulation-based optimization and more intelligent energy decision-making. Through practical exercises, industrial case studies, group problem-solving, simulations, and implementation planning, participants develop an actionable roadmap for improving energy efficiency, operational excellence, ESG performance, and net-zero readiness.

## Programme Curriculum

**Industrial Energy Efficiency Training Course**

**Introduction**

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**Course Duration**

5 days

**Course Objectives**

By the end of the course, participants will be able to:

1. Understand the principles of industrial energy efficiency, energy productivity, and decarbonization.
2. Apply ISO 50001 Energy Management System principles to industrial operations.
3. Conduct structured industrial energy audits and identify significant energy uses.
4. Establish energy baselines, EnPIs, KPIs, and performance-monitoring frameworks.
5. Identify and prioritize energy conservation measures (ECMs) using technical and financial criteria.
6. Optimize major industrial systems including motors, pumps, compressors, boilers, furnaces, HVAC, and process heat.
7. Use IoT sensors, smart meters, AI analytics, and real-time monitoring to improve energy visibility.
8. Understand applications of digital twins and predictive analytics for energy optimization and asset performance.
9. Evaluate renewable energy, electrification, energy storage, and smart-energy integration opportunities.
10. Calculate energy savings, carbon reduction, ROI, payback period, NPV, and lifecycle costs.
11. Integrate Lean, continuous improvement, and Industry 4.0 approaches into energy-performance programs.
12. Develop practical strategies for carbon management, ESG reporting, and net-zero industrial transformation.
13. Create an implementation roadmap for sustained energy performance improvement and operational excellence.

**Target Audience**

1. Energy Managers and Energy Management System professionals
2. Plant Managers and Operations Managers
3. Maintenance and Reliability Engineers

4. Electrical, Mechanical, and Process Engineers
5. Sustainability, ESG, and Decarbonization Professionals
6. Facilities and Utilities Managers
7. HSE, Quality, and Continuous Improvement Professionals
8. Consultants, Auditors, Project Managers, and Technical Leaders

**Course Modules**

**Module 1: Industrial Energy Efficiency Fundamentals & Energy Management**

- Energy efficiency principles, **energy productivity**, energy intensity, and industrial energy flows.
- Energy-cost drivers, demand profiles, load management, and significant energy uses.
- **ISO 50001** framework, energy policy, planning, implementation, monitoring, and continual improvement.
- Energy baselines, **EnPIs**, KPIs, benchmarking, and performance-gap analysis.
- **Case Study:** Developing an energy-management improvement plan for a manufacturing plant with high electricity and process-heat consumption.

**Module 2: Industrial Energy Auditing, Measurement & Energy Performance**

- Energy-audit methodology, data collection, site surveys, measurement plans, and energy mapping.
- Development of **energy balances** and identification of technical energy losses.
- Smart meters, sub-metering, sensors, data acquisition, and real-time energy monitoring.
- Baseline development, normalization, benchmarking, and **measurement & verification (M&V)**.
- **Case Study:** Using plant energy data to identify abnormal consumption and prioritize energy-saving opportunities.

**Module 3: High-Efficiency Motors, Drives, Pumps & Compressed Air**

- **High-efficiency motors**, variable-speed drives, motor loading, and power-quality considerations.
- Pump-system optimization, system curves, throttling losses, and variable-speed operation.
- Compressed-air generation, distribution losses, pressure optimization, and leak management.
- Fan and blower optimization through improved controls and system design.
- **Case Study:** Reducing electricity consumption in a process plant by optimizing motor-driven systems and compressed-air demand.

**Module 4: Boilers, Steam, Process Heat & Thermal Energy Efficiency**

- Boiler efficiency, combustion optimization, excess-air control, and heat-loss assessment.
- Steam generation and distribution, condensate recovery, insulation, and steam-trap management.
- **Waste-heat recovery**, heat exchangers, furnace optimization, and process integration.
- Industrial electrification and emerging **low-carbon process-heat** options.
- **Case Study:** Identifying waste-heat recovery opportunities in a food-processing or manufacturing facility.

**Module 5: Digital Energy Management, AI, IoT & Digital Twins**

- **Industrial IoT (IIoT)** architecture for energy monitoring and operational intelligence.
- AI and machine-learning applications for consumption forecasting, anomaly detection, and optimization.
- **Digital twins** for simulation, scenario analysis, predictive maintenance, and energy optimization.
- Smart energy-management platforms, dashboards, data quality, interoperability, and cybersecurity considerations.
- **Case Study:** Building a digital energy-monitoring concept that connects sensors, production data, analytics, and management dashboards.

**Module 6: Renewable Energy, Electrification & Smart Industrial Energy Systems**

- Industrial solar PV, renewable electricity procurement, and on-site clean-energy opportunities.
- **Energy storage**, demand response, peak shaving, and load flexibility.
- Electrification of suitable industrial equipment and process applications.
- Source-grid-load-storage coordination and smart-energy management.
- **Case Study:** Designing a renewable-energy and storage strategy to reduce grid dependence and peak-energy costs.

**Module 7: Energy Economics, Carbon Management & Net-Zero Strategy**

- Energy-saving project economics: **ROI, payback, NPV, IRR, and lifecycle cost analysis**.
- Carbon accounting, emissions reduction, carbon intensity, and decarbonization pathways.
- **ESG**, sustainability reporting, climate-risk considerations, and energy-related performance indicators.
- Marginal-abatement thinking, project prioritization, and investment decision-making.
- **Case Study:** Ranking a portfolio of efficiency and decarbonization projects according to cost, savings, carbon impact, and implementation complexity.

**Module 8: Energy Optimization, Lean Integration & Implementation Roadmap**

- Integration of **Lean, Kaizen, operational excellence, and energy efficiency**.
- Energy-performance improvement teams, governance, accountability, and employee engagement.
- Project prioritization, implementation barriers, change management, and performance verification.
- Continuous monitoring, corrective action, management review, and sustained savings.
- **Case Study:** Creating a 12-month industrial energy-efficiency roadmap combining Lean improvements, digital monitoring, equipment optimization, and renewable-energy initiatives.

## Training Methodology

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

**Register as a group from 3 participants for a Discount**

**Send us an email: info@fineskilltrainingcenter.org or call** *+254769199797*

***Certification***

*Upon successful completion of this training, participants will be issued with a globally- recognized certificate.*

***Tailor-Made Course***

*We also offer tailor-made courses based on your needs.*

**Key Notes**

**a.** The participant must be conversant with English.

**b.** Upon completion of training the participant will be issued with an Authorized Training Certificate

**c.** Course duration is flexible and the contents can be modified to fit any number of days.

**d.** The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

**e.** One-year post-training support Consultation and Coaching provided after the course.

**f.** Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

## Upcoming Scheduled Sessions

| Start Date | End Date | Location | Price |
|---|---|---|---|
| **23 Nov 2026** | 27 Nov 2026 | Online | $1,000 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $1,500 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $3,000 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $3,000 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $6,000 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $4,500 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $6,000 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $6,000 |

Ready to enroll or request a customized program? Book online or contact us:

**Register Online Now**

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