High-Efficiency Industrial Systems Training Course

Professional Development Training Course Outline

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

Course Introduction

High-Efficiency Industrial Systems Training Course equips professionals with the advanced knowledge and practical capabilities required to optimize industrial energy efficiency, operational performance, smart manufacturing, and sustainable production. The program focuses on high-impact systems including electric motors, pumps, compressors, boilers, HVAC, steam systems, process heating, compressed air, industrial automation, energy management, and renewable energy integration. Participants learn how to identify energy losses, improve equipment performance, reduce operating costs, strengthen reliability, and implement measurable decarbonization and Net Zero strategies across industrial facilities.

Through practical learning, data-driven diagnostics, Industry 4.0 technologies, IoT-enabled monitoring, predictive maintenance, digital energy management, and energy-performance optimization, participants develop the skills to transform inefficient industrial operations into high-performing systems. The course combines engineering principles with real-world case studies, energy audits, benchmarking, lifecycle-cost analysis, carbon reduction, and continuous improvement, enabling organizations to achieve stronger productivity, lower energy intensity, improved asset utilization, and long-term ESG and sustainability performance.

Programme Curriculum

High-Efficiency Industrial Systems Training Course

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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 sustainable manufacturing.
2. Conduct systematic industrial energy audits and identify major energy-saving opportunities.
3. Optimize electric motor systems, variable-speed drives, and high-efficiency equipment.
4. Improve pump and fan system efficiency using system-level optimization.
5. Optimize compressed-air systems and eliminate leakage, pressure, and distribution losses.
6. Improve boiler, steam, and process-heating efficiency while reducing fuel consumption.
7. Apply HVAC optimization, heat recovery, and thermal-energy management techniques.
8. Implement predictive maintenance and condition monitoring to improve asset efficiency and reliability.
9. Use IoT sensors, smart meters, AI analytics, and digital energy platforms for performance monitoring.
10. Develop energy-performance indicators (EnPIs) and effective industrial energy dashboards.
11. Evaluate carbon emissions, energy intensity, and Net Zero opportunities across industrial processes.
12. Perform lifecycle cost analysis, ROI, payback, and investment prioritization for efficiency projects.
13. Develop actionable energy-management and decarbonization roadmaps aligned with ESG and operational goals.

Target Audience

1. Energy Managers
2. Maintenance Managers and Engineers
3. Production Managers
4. Electrical and Mechanical Engineers
5. Facility and Plant Managers
6. Sustainability and ESG Professionals Automation, Controls, and Digital Transformation Professionals
7. Technical Consultants, Auditors, and Project Managers

Course Modules

Module 1: Industrial Energy Efficiency & Smart Energy Management

- Industrial energy-flow mapping, energy baselining, benchmarking, and energy intensity.
- Energy audits, measurement plans, energy-performance indicators (EnPIs), and data analysis.
- ISO 50001 principles, energy-management systems, and continuous improvement.

- Smart metering, IoT-enabled energy monitoring, dashboards, and real-time analytics.
- Case Study: Developing an energy-efficiency roadmap for a manufacturing plant with high electricity consumption.

Module 2: High-Efficiency Motor & Drive Systems

- Motor efficiency classes, IE3/IE4/IE5 motors, loading, sizing, and operating efficiency.
- Variable Frequency Drives (VFDs) for speed control and energy optimization.
- Power quality, harmonics, power factor, and electrical-system efficiency.
- Motor-system optimization through alignment, maintenance, controls, and operating profiles.
- Case Study: Reducing energy consumption in a production-line motor system through VFD optimization and right-sizing.

Module 3: Pump, Fan & Fluid-System Optimization

- Pump and fan fundamentals, system curves, efficiency curves, and operating points.
- Variable-speed control, throttling losses, bypass systems, and flow optimization.
- Hydraulic-system assessment, pipe sizing, pressure losses, and system balancing.
- Digital monitoring and predictive maintenance for rotating equipment.
- Case Study: Optimizing a water-pumping network to reduce electricity consumption and improve system reliability.

Module 4: Compressed Air, Steam & Boiler Efficiency

- Compressed-air generation, distribution, storage, pressure optimization, and leak detection.
- Compressor sequencing, variable-speed compressors, and compressed-air energy management.
- Boiler efficiency, combustion optimization, blowdown management, and heat recovery.
- Steam traps, condensate recovery, insulation, and steam-system loss reduction.
- Case Study: Achieving major energy savings by correcting compressed-air leaks and optimizing system pressure.

Module 5: HVAC, Thermal Systems & Heat Recovery

- High-efficiency HVAC design, controls, ventilation, cooling, and heating optimization.
- Chiller efficiency, cooling-tower optimization, and variable-speed operation.
- Waste-heat recovery, heat exchangers, thermal integration, and process optimization.
- Insulation, thermal losses, temperature control, and process-heating efficiency.
- Case Study: Recovering waste heat from an industrial process to reduce boiler fuel demand.

Module 6: Industry 4.0, IoT & Predictive Maintenance

- Industry 4.0, Industrial IoT (IIoT), sensors, connected equipment, and smart factories.
- AI-assisted energy analytics, anomaly detection, and predictive maintenance.
- Digital twins, condition monitoring, equipment-health indicators, and remote diagnostics.
- Real-time dashboards for energy, production, maintenance, and carbon performance.
- Case Study: Using IoT monitoring and predictive analytics to identify abnormal equipment energy consumption.

Module 7: Industrial Decarbonization, Renewable Energy & Net Zero

- Industrial decarbonization strategies, carbon accounting, and emissions reduction.
- Solar PV, energy storage, electrification, and renewable-energy integration.

- Energy efficiency as a foundation for Net Zero industrial transformation.
- Scope 1, Scope 2, and relevant Scope 3 emissions considerations.
- Case Study: Creating a phased Net Zero roadmap combining energy efficiency, electrification, and renewable power.

Module 8: Energy-Efficiency Projects, Economics & Implementation

- Identifying and prioritizing energy conservation measures (ECMs).
- ROI, payback period, NPV, lifecycle cost, and total cost of ownership (TCO).
- Measurement and verification (M&V) of energy savings and project performance.
- Building business cases, securing management support, and managing implementation risks.
- Case Study: Ranking multiple industrial efficiency projects and selecting investments based on savings, carbon impact, and lifecycle economics.

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

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