Training course on Energy Efficiency in Buildings and Infrastructure Operations

Professional Development Training Course Outline

Category	Civil Engineering and Infrastructure Management	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

In an era of escalating energy costs, growing environmental concerns, and the urgent need to mitigate climate change, optimizing energy consumption in buildings and infrastructure operations has become a paramount global imperative. Buildings, both commercial and residential, along with critical infrastructure such as water treatment plants, transportation systems, and public facilities, are significant consumers of energy, contributing substantially to greenhouse gas emissions and operational expenses. Traditional operational practices often overlook opportunities for efficiency gains, leading to unnecessary energy waste and a larger carbon footprint. Achieving high levels of energy efficiency is no longer merely a cost-saving measure but a fundamental component of sustainable development, enhancing resilience, reducing environmental impact, and improving financial performance. This necessitates a comprehensive understanding of energy consumption patterns, advanced monitoring techniques, and innovative strategies for optimization across diverse operational contexts. Training Course on Energy Efficiency in Buildings and Infrastructure Operations is meticulously designed to equip with the advanced knowledge and practical skills required to assess, implement, and manage effective energy efficiency strategies in both new and existing buildings and infrastructure operations. Participants will gain a comprehensive understanding of energy auditing principles, smart building technologies, renewable energy integration at the operational level, and behavioral change strategies. The curriculum will delve into cutting-edge approaches such as building management systems (BMS) optimization, advanced HVAC and lighting controls, demand-side management, and the use of data analytics for continuous improvement. Through a blend of theoretical instruction, hands-on energy assessment exercises, and in-depth case studies of successful energy efficiency initiatives globally, attendees will develop the expertise to identify energy hotspots, formulate robust energy management plans, evaluate the economic benefits of efficiency measures, and navigate the evolving regulatory and financial landscapes supporting sustainable operations. This course is indispensable for professionals committed to driving energy savings, reducing operational costs, and contributing directly to a low-carbon, sustainable built environment.

Programme Curriculum

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Course Objectives

Upon completion of this course, participants will be able to:

1. Define energy efficiency and its critical role in sustainable buildings and infrastructure operations.
2. Understand the major sources of energy consumption in various building types and infrastructure facilities.
3. Apply methodologies for conducting comprehensive energy audits and performance assessments.
4. Identify and implement energy-efficient technologies for HVAC systems, lighting, and equipment.
5. Explore the principles and applications of Building Management Systems (BMS) and smart controls.
6. Integrate renewable energy solutions for on-site power generation in operational contexts.
7. Develop strategies for optimizing energy use through demand-side management and load shifting.
8. Understand the role of data analytics and continuous monitoring in energy performance improvement.
9. Formulate comprehensive energy management plans for buildings and infrastructure operations.
10. Navigate relevant policies, regulations, and certifications promoting energy efficiency.
11. Evaluate the economic viability and return on investment of energy efficiency measures.
12. Analyze case studies of successful energy efficiency projects in diverse operational settings globally.

13. Drive organizational change towards a culture of continuous energy optimization.

Target Audience

This course is essential for professionals seeking to enhance energy efficiency in buildings and infrastructure operations:

1. Facility Managers: Responsible for building operations and energy performance.
2. Energy Managers: Specializing in energy auditing, optimization, and reporting.
3. Mechanical & Electrical Engineers: Designing and maintaining building systems.
4. Building Owners & Developers: Seeking to reduce operational costs and environmental impact.
5. Sustainability Consultants: Advising on energy efficiency and green building strategies.
6. Public Works Officials: Managing energy use in public infrastructure facilities.
7. Urban Planners: Integrating energy efficiency into urban development and smart city initiatives.
8. Environmental Managers: Focusing on carbon reduction and resource conservation.

Course Duration

5 Days

Course Modules

Module 1: Fundamentals of Energy Consumption in Buildings and Infrastructure

- Define energy efficiency, energy conservation, and their importance.
- Analyze major energy end-uses in commercial, residential, and infrastructure buildings.
- Discuss energy consumption patterns in infrastructure operations (e.g., water pumping, traffic lights).
- Understand the relationship between energy use, greenhouse gas emissions, and climate change.
- Overview of global and national energy efficiency targets and policies.

Module 2: Energy Auditing and Performance Assessment

- Learn methodologies for conducting Level 1, 2, and 3 energy audits.
- Understand data collection techniques for energy consumption and operational parameters.
- Explore the use of energy meters, sub-meters, and data loggers.
- Discuss benchmarking energy performance against industry standards and best practices.
- Apply energy auditing principles to identify energy saving opportunities.

Module 3: HVAC System Optimization

- Understand the principles of heating, ventilation, and air conditioning (HVAC) systems.
- Explore strategies for optimizing HVAC performance: efficient equipment, zoning, controls.
- Discuss demand-controlled ventilation and variable air volume (VAV) systems.
- Learn about heat recovery ventilation and efficient chiller/boiler technologies.
- Analyze the impact of building envelope improvements on HVAC loads.

Module 4: Lighting System Efficiency

- Identify opportunities for energy savings in lighting systems.
- Explore high-efficiency lighting technologies (e.g., LED lighting, smart lighting).
- Discuss lighting controls: occupancy sensors, daylight harvesting, dimming systems.
- Understand the principles of daylighting integration to reduce artificial lighting needs.
- Apply lighting design principles for optimal energy performance and visual comfort.

Module 5: Building Management Systems (BMS) and Smart Controls

- Define Building Management Systems (BMS) and their role in energy optimization.
- Explore advanced control strategies for HVAC, lighting, and other building systems.
- Discuss the integration of sensors, IoT devices, and data analytics for smart operations.
- Understand fault detection and diagnostics (FDD) for continuous commissioning.
- Learn about predictive control and AI-driven optimization in BMS.

Module 6: Renewable Energy Integration for Operations

- Explore the application of on-site solar photovoltaic (PV) systems for building and infrastructure power.
- Discuss small-scale wind energy and geothermal heat pump systems for operational needs.
- Understand the role of battery energy storage systems (BESS) for peak shaving and resilience.
- Learn about grid integration, net metering, and power purchase agreements (PPAs).
- Analyze the economic and environmental benefits of renewable energy integration.

Module 7: Energy Efficiency in Infrastructure Operations

- Identify specific energy efficiency opportunities in water and wastewater treatment plants.
- Discuss energy savings in transportation infrastructure (e.g., smart traffic lights, electric vehicle charging).
- Explore efficient pumping systems and motor controls in water distribution networks.
- Understand energy optimization in public lighting and street furniture.
- Analyze case studies of energy efficiency in diverse infrastructure operations.

Module 8: Energy Management Planning and Implementation

- Develop a comprehensive energy management plan (EMP) for an organization or facility.
- Discuss strategies for engaging occupants and promoting behavioral change for energy savings.
- Explore financing mechanisms for energy efficiency projects (e.g., energy performance contracts).
- Understand monitoring, reporting, and verification (MRV) of energy savings.
- Learn about continuous improvement cycles for long-term energy optimization.

Training Methodology

- **Interactive Workshops:** Facilitated discussions, group exercises, and problem-solving activities.
- **Case Studies:** Real-world examples to illustrate successful community-based surveillance practices.
- **Role-Playing and Simulations:** Practice engaging communities in surveillance activities.
- **Expert Presentations:** Insights from experienced public health professionals and community leaders.
- **Group Projects:** Collaborative development of community surveillance plans.
- **Action Planning:** Development of personalized action plans for implementing community-based surveillance.
- **Digital Tools and Resources:** Utilization of online platforms for collaboration and learning.
- **Peer-to-Peer Learning:** Sharing experiences and insights on community engagement.
- **Post-Training Support:** Access to online forums, mentorship, and continued learning resources.

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

- Participants must be conversant in English.
- Upon completion of training, participants will receive an Authorized Training Certificate.
- The course duration is flexible and can be modified to fit any number of days.
- Course fee includes facilitation, training materials, 2 coffee breaks, buffet lunch, and a Certificate upon successful completion.
- One-year post-training support, consultation, and coaching provided after the course.
- Payment should be made at least a week before the training commencement to Fineskill Training Center account, as indicated in the invoice, to enable better preparation.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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

Register Online Now