



LIGHTING SYSTEMS - CEM REFRESHER

ONLINE TRAINING COURSE

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ENERGY SPECIALIST CURRICULUM





WHAT TO LOOK FOR IN LIGHTING AUDIT

FOR ENERGY PROFESSIONALS

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WHAT SHOULD YOU LEARN

What Is a Lighting Audit?

What to Look for in Lighting Audit

Applications of Compact Fluorescent Lights



WHAT IS A LIGHTING AUDIT?



What Is a Lighting Audit?

A Lighting Audit is an onsite walkthrough of an existing facility to document the current lighting conditions and determine where energy saving changes can be made. It can be conducted for both exterior and interior spaces, and involves collecting four main types of information: general, lighting, occupant, and financial.

WHAT IS A LIGHTING AUDIT? +



☑ General Information:

General information includes floor plans and ceiling plans that show current fixture locations. Room dimensions, as well as ceiling heights are also documented. Any future plans for renovation are also collected, if available.

☑ Lighting information for each area being considered is also collected. This includes information such as the:

Number of fixtures ,Type and size of fixtures ,Number of lamps per fixture or ballast, Type of lamps or ballasts ,Fixture wattage ,Tasks performed in the space, Hours of operation in the space Height at which tasks are performed and Availability of natural daylight

WHAT IS A LIGHTING AUDIT? +



☑ Occupant Information:

It is also important to know how occupants feel about their current lighting system, as their insight can provide information to fill the gaps a physical inspection cannot determine. This step usually involves interviews or surveys, where the auditor asks the regular occupants of each space to reflect on how the lighting currently affects them. Questions can include whether occupants are experiencing glare on their computer screen, if they find the lighting too dim when they work at their stations or whether it is too bright (especially in areas where there is natural light) during the day.

WHAT IS A LIGHTING AUDIT? +

Financial Information :

With the physical space and how users react to it documented, the last step of a Lighting Audit is to collect financial information. Knowing the average charges for electricity (kWh) and demand (kW) is important to calculating current operating costs and the eventual long-term savings gained from replacing everything with energy-saving fixtures.

WHAT TO LOOK FOR IN LIGHTING AUDIT

- ✓ Lighting Equipment Inventory
- ✓ Lighting Loads
- ✓ Room Dimensions
- ✓ Illumination Levels
- ✓ Hours of Use
- ✓ Lighting Circuit Voltage

POTENTIAL LIGHTING ECMS

- Fluorescent Upgrades
- Delamping
- Incandescent Upgrades
- HID Upgrades
- Controls Upgrades
- Daylight compensation

THREE MAJOR AREAS FOR LIGHTING IMPROVEMENT



Much of the cost savings from new retrofit lighting can be achieved in three major areas:

1. Replace incandescent lamps with fluorescent, or compact fluorescent lamps (CFLs)
2. Upgrade fluorescent fixtures with improved components
3. Install lighting controls to minimize energy costs



APPLICATIONS OF COMPACT FLUORESCENT LIGHTS



- ☒ Task lights
- ☒ Downlights
- ☒ Wall washers
- ☒ Outdoor fixtures – even in low temperatures
- ☒ Many kinds of fixtures available
- ☒ Exit lights
- ☒ Can be dimmed – so use in conference rooms
- ☒ Can be used in refrigerators and freezers



UPGRADING FLUORESCENT FIXTURES



- ☒ Improved fluorescent lamps
 - ⇒ T-8, T-10, T-12 Tri-phosphor lamps
 - ⇒ T-5 lamps
 - ⇒ New induction lamps
- ☒ Electronic ballasts
 - ⇒ Standard non-dimmable ballasts
 - ⇒ Consider dimming ballasts
 - ⇒ New programmable ballasts
- ☒ Reflectors



WHAT DOES A BALLAST DO?

☑ A ballast does three things

- ➔ Conditions the lamp to start
- ➔ Applies a high voltage spike to start the gas discharge process
- ➔ Applies a current limiter to reduce the lamp current to a safe operating level

☑ Ballast factor

- ➔ Normal light output (0.85-0.95)
- ➔ Can specify reduced or increased light output in electronic ballasts with proportional reduction or increase in power





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