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## Energy-Efficient Lighting

*All ECM content was independently developed and reviewed to be vendor, product and service provider-neutral.*

### Description

Installing new lighting or retrofitting with energy efficient systems will result in a reduction of energy use and maintenance. Additional controls can further drive savings by automatically dimming and/or turning off unnecessary lights.

### Project Talking Points

- Energy usage is one of the costs that hospitals can reduce without sacrificing quality and/or patient care. In fact, it often improves patient care. The U.S. Department of Energy estimates that nationally, health care facilities use twice as much energy as other commercial buildings and emit almost 40 million tons of greenhouse gases annually.
- Due to the around the clock nature of lighting in hospitals, efficient bulbs and fixtures are crucial to an energy efficient lighting program.
- Lighting affects other building systems through its electrical requirements and the waste heat it produces.
- Assessing the intensity of lighting in different areas (for example, what levels of illumination are appropriate for a clinical area versus a parking garage) may identify opportunities for modifications and greater efficiency.
- Energy-efficient lighting measures will improve the financial bottom line and can also have a positive impact on patient safety and satisfaction.
- The installation of daylighting controls, dimmers and occupancy sensors will further drive savings.
- Energy-efficient lighting has a longer life expectancy, therefore reducing the burden on maintenance staff.

### Benefits

- **Cost benefits:** Energy efficient lighting reduces energy use, resulting in cost savings. The longer life expectancy of the lighting will reduce the number of bulbs and fixtures purchased, as well as reducing the frequency of replacements.
- **Environmental benefits:** Lighting impacts the environment in several ways, including energy usage, materials used to produce lighting products and outdoor light pollution. Energy-efficient lighting requires less electricity, which lowers



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emissions from polluting power plants. Energy-efficient lighting also reduces the number of toxic chemicals released into the waste stream.

- **Social benefits:** Light plays a role in our sleep patterns and, as a result, our overall health. Energy-efficient lighting will often produce a better-quality light, improving visibility on security cameras and in otherwise dark parking areas. Better quality light and controls will create better surgical outcomes and patient examinations.

### **Purchasing Considerations**

- Partner with lighting vendors to conduct a facility walkthrough, assessing the opportunities to convert to more energy efficient lighting technologies. Vendors will also typically support the creation of an ROI analysis.
- The current standard in energy efficient lighting is the light emitting diode (LED) bulb. These bulbs can be installed in your standard fixture but do not require a ballast, like with T12 or T8 tube lighting.
- The market has been flooded with different LED bulbs. To ensure quality, look for the DesignLights Consortium (DLC) and/or the ENERGY STAR® stamp. They are unbiased, third-party reviewers of lighting.
- Check your local utility for energy efficiency rebates on your efficient lighting project. Many will offer rebates on bulbs and lighting controls.

### **How-To**

1. For organization-wide replacement/installment: Research which commercially available, cost-effective lighting technologies offer the best opportunity for your hospital/system to achieve high-energy savings and reduce hospital operations and maintenance costs. Identify companies to bid on the project and include input from county and city energy providers, public utility districts and vendors.
  - Ask the company/organization to conduct a thorough audit of current usage and costs, feasibility study, assessment of lumen levels and a comprehensive review of how the building is used.
  - Based on the study, the company should identify a suitable replacement solution from a complete portfolio of lighting solutions, and devise an implementation program for lamps, luminaires and controls.
2. Individual projects and low-hanging fruit:
  - Install LEDs in exit signs and elsewhere where cost-benefit analysis shows it makes sense for the longer life expectancy of an LED.



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- Select products that qualify for the U.S. Environmental Protection Agency (EPA) ENERGY STAR certification program and are DLC approved. The products should also reduce mercury toxicity and provide optimal performance.
  - Replace older T12 or T8 technologies with LEDs. Understand there are three options for replacing light tubes with LEDs:
    - Direct bulb replacement: This is the least expensive option. However, since LED tubes do not require a ballast, there will be energy losses through the existing ballast, lessening the efficiency.
    - LED direct wire: This option involves bypassing the ballast and wiring “line voltage” directly to the LED tubes. The downside is that this option makes bulb changes dangerous, as high voltage will be exposed at the pins.
    - Full fixture replacement: This is the most expensive option but is the optimal choice in terms of safety and efficiency.
  - Both low-tech and high-tech solutions for controlling lighting can prove to be effective. High-performance lighting systems significantly reduce energy usage by ensuring electric lighting is used only when necessary. Develop a lighting awareness campaign to train staff to turn off lights when rooms are not in use.
3. The following options can save energy without affecting patient care or facility functionality:
- Incorporate daylighting controls in patient rooms and public spaces with large windows.
  - Integrate controls that enable continuous dimming.
  - Install occupancy sensors in spaces frequently unoccupied, such as restrooms, stairwells, service areas and mechanical plants. However, make sure you follow local code for emergency situations.
  - Use sensors that include dimming and stepping options for spaces that utilize day lighting.
  - Incorporate exterior motion sensors, which can save energy and enhance security while maintaining adequate light for safety.
- Consider photoluminescent egress signage subject to local fire department and other regulatory criteria.

### **Case Studies**

- **St. Mary’s Hospital, Leonard Town, MD**
  - [Energy Efficient Hospital Lighting Strategies Pay Off Quickly, U.S. Department of Energy](#)





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## **Resources**

- ENERGY STAR:
  - [Exit sign product criteria](#)
  - [For health care](#)
  - [Qualified products](#)
- EPA: [Recycling lamps at end of life](#)
- Illuminating Engineering Society (IES): The Lighting Handbook
- Money Magazine: [Incandescent Light Bulb Ban Put on Hold](#)
- Practice Greenhealth: [Best Practices in Energy Efficiency](#)
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## **Regulations, Codes and Standards, Policies**

As part of the Energy Independence and Security Act of 2007 (Pub.L. 110-140 originally named the Clean Energy Act of 2007), incandescent bulbs were to be phased out and no longer manufactured in the United States starting January 1, 2012. However, a last-minute rider attached to the [omnibus government spending bill](#) impacted the 2007 energy standards. Congress basically rescinded the incandescent ban by eliminating the funds the U.S. Department of Energy would need to enforce it. Currently, there is no federal law regarding energy-efficient lighting, but this topic continues to be debated on Capitol Hill.

The Energy Policy Act of 2005 created the Energy Efficient Commercial Buildings Deduction, which allows building owners to deduct the entire cost of a lighting or building upgrade in the year the equipment is placed in service, subject to a cap. This [website](#), developed by the Lighting Systems Division of the [National Electrical Manufacturers Association](#) (NEMA) in cooperation with [the Commercial Building Tax Deduction Coalition](#), provides education about the lighting aspects of the deduction and resources to help with its implementation.

## **ECM Synergies**

Replace magnetic ballast, T12 and incandescent lighting fixtures with more efficient fixtures.

## **ECM Descriptors**

Energy, Supply Chain

Category List:





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- Lighting

ECM Attributes:

- Energy
- Water

Improvement Type:

- Energy

Department:

- Engineering/facilities management