

November 2007

Holiday Lights: LED and Fiber Optics

Decorating with “holiday lights” is becoming more of a year-round activity. As more lighting is used and as energy rates climb, consumers find that decorating with lights is costing more. Most people currently use standard incandescent C7 lights or mini-lights.

There are better ways! LED lights and fiber optic trees are two energy-efficient technologies that can reduce your energy costs, particularly when the lights are used for long periods of time, such as in commercial applications.

LED Lights

Light Emitting Diode (LED) holiday lights are a new application for a mature technology. Each year since 2002, manufacturers have improved the choices, producing bigger and brighter bulbs and new color options. LED lights have a number of benefits over conventional lighting:

- **Energy-efficient** – 0.08 watts per LED C7 multicolor bulb (compared with 0.48 watts for an incandescent mini-light and 6.0 watts for a standard incandescent C7 bulb).
- **Long life span** – up to 100,000 hours or more used indoors, half that outdoors, and some manufacturers provide a limited lifetime warranty.
- **Safety** – no chance of combustion since the bulbs are cool to the touch, regardless of how long they are left on.

- **Sturdy bulbs** – the epoxy lenses are virtually indestructible.

LED lights are currently available in strings from 25 to 150 bulbs with red, green, blue, white, yellow and multi-colored bulbs. There are many styles available including mini-ice, ball-shaped, and C3, C5, C6, C7 and C9 (candle-shaped) bulbs (see photos on page 2). Amber or orange Halloween lights and patriotic red, white and blue sets are also available. Costs may vary substantially by color because, rather than painted bulbs, the color is produced by the chemical make-up of the bulb. Pink, purple, ice white and warm white may cost more.



Many Americans love to decorate during the holidays with strings of lights, and most people currently use standard incandescent C7 lights or mini-lights. Two energy-efficient alternatives to consider are LED lights (like these) and fiber optic

New products include icicle-style lamps, strings that change from one color to another, strings with commercial-quality plugs that allow more than 100 strings to be connected, rope lights, and additional holiday ornaments. At least one company is offering screw-in LED bulbs for converting your incandescent strings to LED.

LED lights have a different appearance from the familiar incandescent models. They may appear to shimmer with movement as the light passes through the faceted bulbs. Side-by-side with an equal-sized incandescent bulb, the LED will not be as bright in all directions, but some small, smooth “rice” type lamps appear nearly as bright. In spite of the differences, LED lights offer beautiful and affordable holiday decorating. If you are ordering a quantity, be sure to

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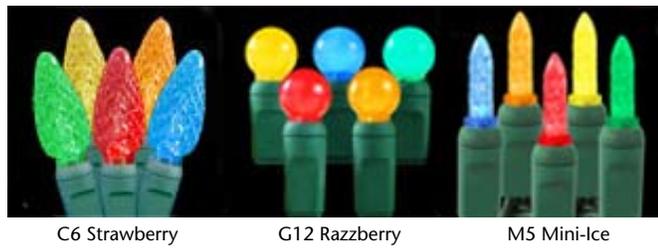
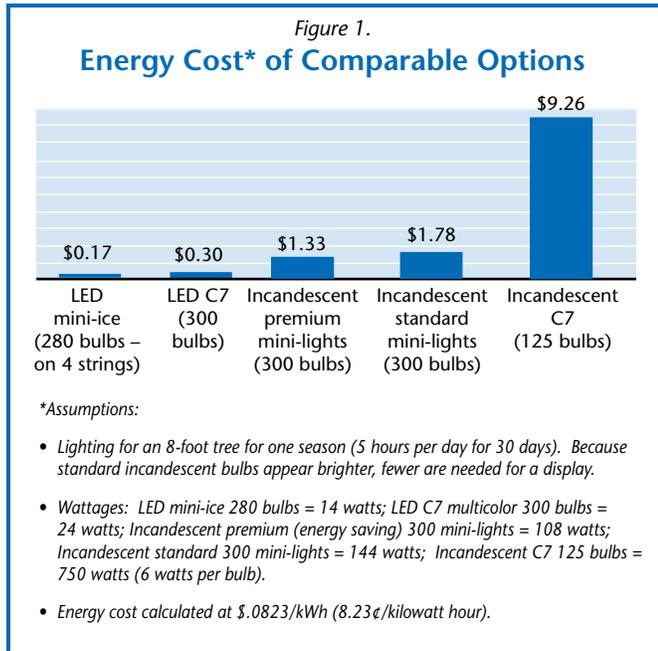
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get your orders in early. Some vendors suggest that commercial orders be placed in February.

As illustrated in *Figure 1*, keep the cost to operate energy-consuming devices over time overcomes the initial purchase price. Despite a higher initial cost, LEDs are a clear winner over incandescent C7 lights when you compare the cost to purchase and operate a system for five years (and beyond).



Fiber Optic Artificial Trees

Another relatively energy efficient tree lighting strategy is the fiber optic artificial tree. These trees use a single bulb ranging from 5 to 50 watts, depending on the size of the tree. Light is transmitted from the single bulb through hundreds of very small fibers and emitted along each branch of the tree. Some trees come equipped with a rotating color wheel that changes the color emitted from the fibers.

Pre-lit fiber optic trees powered by LEDs are now avail-



able, as well as pre-lit fiber optic trees with decorative LED bulbs on the branches.

Fiber optic lights are cool to the touch, as only light is transmitted from the fiber and not heat. The incandescent light source is located in the base of the tree with ventilating holes that must not be covered. The cost for such trees ranges from \$20 for a 2- to 3-foot tree to over \$200 for the largest trees. Fiber optics are also now used in many other decorations such as Santa or Angel figures and wreaths.

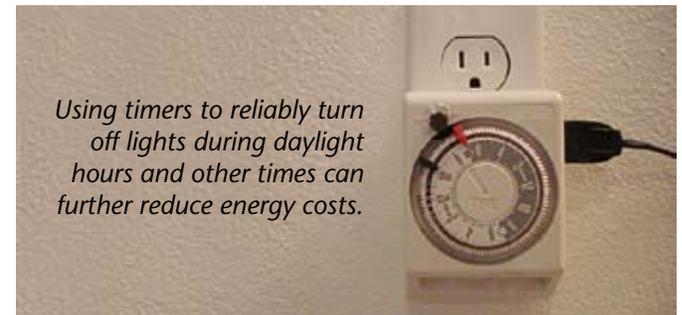
A Note About Wiring

The wiring is a weak link in any system. Improperly attaching light sets with staples, winding wires around nails, and other practices can damage wiring, as can prolonged exposure to sunlight. Treating the wiring with care will extend the life of any light set and increase safety as well.

Before putting up your lights, test the system and inspect the wires for defects. Many shoppers now note a warning on light set packaging regarding lead in the wire coatings. The coatings are the same on all wiring, and washing hands after handling is recommended, but the wires of today are no different in this respect than the unlabeled ones of the past.

More Holiday Lighting Information

For current news, purchasing sources, commercial design resources, cost calculators and safety considerations: www.energyideas.org/holiday



The *EnergyIdeas* Clearinghouse provides information on a broad range of energy technologies for commercial and industrial customers of Pacific Northwest utilities. The *EnergyIdeas* Clearinghouse provides a searchable website and has a team of energy specialists ready to respond to technical information requests by phone or email. Sponsored by the Northwest Energy Efficiency Alliance.

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