

Being Green With Lighting



What is **Green** Lighting?



Green Lighting

- Eco-Friendly
- Energy Efficient
- Long Life

Green Lighting

- **Eco-Friendly** - Can the bulb or the fixture be produced and destroyed without a negative environmental impact?
- **Energy Efficient**
- **Long Life**

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- **Energy Efficient** – Will the bulb or the fixture produce energy reductions with the same output of light compared to the existing bulb or fixture?
- **Long Life** – Will the bulb or the fixture last a long time? Will it's cost be paid back with time to spare before it burns out?




Ways Of Green

- Dimming
- Occupancy Sensors
- Fluorescent
- CFL's
- Halogen / Incandescent
- LED's

Dimmers Dimmers Dimmers



Dimming

Lutron Dimmers Pay for Themselves:			
	Dimming the lights...	Saves electricity	Makes incandescent bulbs last longer
	Dimming the lights...	10%	2 times longer
	Protects the environment...	25%	4 times longer
	Saves time and money	50%	20 times longer
		75%	>20 times longer

Save \$230,000,000.00 ???

Home Lighting Control

Commercial Lighting Control

Products

Service & Support

Where to Buy

Technical Info

Light Greener, Light Better™

Buy Now...

Lutron light controls save energy

Compared to standard light switches, Lutron light controls save energy, while creating inviting, comfortable spaces at home or work — making light greener and better.

Did you know?

Installing one dimmer in every US home in place of a standard light switch would:



Save \$230 million in electricity per year and CO2 by 4.3 billion pounds per year, equivalent to taking 370,000 cars off the road



Want help saving energy on your project?

[Get a free consultation](#)

What is the best bulb for me?

[Use our guide for selecting light bulbs](#)

[Click here for our data and sources](#)



How much will you save?

Use our interactive dimmer calculator to explore the savings:

At Home ▶

At Work ▶

residential light control

Lutron® dimmers save energy. Always have. Always will.

Dim a light to 50% and you'll cut the electricity used by about 40%. Lighting accounts for nearly 20% of the average home's electricity bill, so dimming makes an impact.

Facts about Lutron dimmers

Installing one Lutron dimmer in every home in the U.S. in place of a standard light switch would:

- Save \$230 million in electricity per year
- Reduce CO₂ by 4.3 billion pounds per year
- Equal taking 370,000 cars off the road

Dimming your lights 25% saves 20% in energy.

And, the more you dim, the more you save.

A 1,500-hour incandescent bulb will last nearly ten years when dimmed 33% and used 3 hours per day.

That's longer than the average American keeps a home.

Dimming the next generation of light sources

The chart below shows the next generation of dimmable lights for the home. Compact fluorescent and halogen lights are viable alternatives to traditional incandescent bulbs. And a dimmed halogen bulb will typically last longer than a screw-in compact fluorescent.



Maestro® Diva® Skylark® Ariadni® Rotary

eco-dim™ dimmers

The Lutron® **eco-dim™** family of dimmers guarantees at least 15% energy savings compared to a standard switch. Designed for use with incandescent or halogen bulbs, the bulbs controlled by the dimmer will last more than three times their rated life.

Individual dimmers, entire room controls, and whole home Lutron solutions use the right amount of light to create the perfect ambiance while saving energy.

For additional details and to see how much you can save, visit www.lutron.com/energy.

Light sources	Rated life	Life when dimmed 25% ⁵	Energy savings when dimmed 25% ⁵
 MR-16¹	3,000 hours	Up to 12,000 hours	Up to 20%
 Energy saver halogen	3,000 hours	Up to 12,000 hours	Up to 20%
 LED²	50,000 hours	Up to 50,000+ hours	Up to 20%
 4-pin CFL³	10,000 hours	Up to 10,000 hours	Up to 20%
 Dimmable screw-in CFL⁴	8,000 hours	Up to 8,000 hours	Up to 20%

Compared to standard light switches, Lutron light controls create inviting, comfortable spaces while saving energy* at home or work – making light greener and better.

* Based on using the same lights over the same time period.

1 Requires low-voltage transformer.
2 Requires Lutron H-Humex LED driver.
3 Requires Lutron H-Humex dimming ballast.
4 Requires Philips energy saver dimmable CFL (www.lutron.com/dmctf).
5 Compared to light level at full-on.

Occupancy Sensors



Occupancy Sensor / Wall



Product Family Features

- The LOS-W series are wall-mounted sensors that are used in spaces with pendant fixtures, ceiling fans, or high ceilings (greater than 12 ft. high). The passive infrared (PIR) version has good false tripping immunity and is well suited for major motion. The dual-technology versions offer excellent minor motion detection via ultrasonic (US) technology to ensure optimal power savings and occupancy detection.
- The LOS-W sensors all have self-adaptive technology that eliminates the need for manual range adjustment. After proper mounting, the sensors automatically adjust sensitivity and timing to prevent false-off and false-on conditions. To control other building systems such as HVAC or security system use the 'R' model, which provides an additional dry contact closure.

Specification Features

- Range of 1600 sq. ft. if mounted at 8 ft. to 12 ft. from floor
- 8-second test mode to easily confirm proper operation
- Model with additional output (dry contact closure) available
- Non-volatile memory (saved changes are stored during loss of power)
- Integrate with Lutron systems (no power pack needed) or function as stand-alone controls using a Lutron power pack
- 20-24 VDC, Class 2 (PELV) low-voltage wiring
- Self-adaptive sensors automatically adjust sensitivity and timing
- Passive infrared (PIR), or dual-technology – both PIR and US

Occupancy Sensor / Switch



Product Family Features

- The LOS-S series of sensors offer a direct and quick replacement of wall switches for stand-alone line voltage switching of small spaces. Ultrasonic sensors have excellent minor motion detection such as typing at a keyboard. Infrared detectors have good false tripping immunity, and are better suited for major motion.
- Lutron offers "M" models (LOS-SIR-M-WH and LOS-SIR-M-IV), which are manual-on occupancy sensors. Users push the button to turn the lights on and the lights turn off automatically when space is unoccupied. These "M" models meet Title 24 energy code requirements for residential buildings in California.
- A two-circuit version of the PIR wall switch (LOS-S2IR-HD) is designed for dual-level lighting applications and allows for two primary input circuits, each with independent switching. The "HD" versions of this series have a hardened lens, which provides a barrier to accidental and vandal-imposed damage.

Specification Features

- Range from 900 sq. ft to 1000 sq. ft
- 2 heavy-duty models "HD" which are vandal resistant
- No power pack required
- LED test indicator
- Dual circuit with independent switching model available (LOS-S2IR)
- 120/277 VAC dual voltage operation
- LOS-SUS model has self-adaptive technology which automatically adjusts timing and sensitivity
- Passive infrared (PIR) and ultrasonic (US) technologies

Occupancy Sensor / Ceiling



Product Family Features

- The LOS-C series ceiling mount sensors offer a wide range of technologies and can either integrate into Lutron systems (no power pack needed) or function as stand-alone controls using a Lutron power pack. The ultrasonic sensors have excellent minor motion detection, such as typing at a keyboard. The passive infrared sensors provide false tripping immunity, and are better suited for major motion. The dual-technology versions combine both features to provide optimal power savings and occupancy detection.
- The LOS-C sensors all have self-adaptive technology that eliminates the need for manual adjustments. After correct mounting, the sensors automatically adjust sensitivity and timing to prevent false-off and false-on conditions. To control other building systems such as HVAC or security system use the 'R' models, which provides an additional dry contact closure.

Specification Features

- Self-adaptive sensors automatically adjust sensitivity and timing
- Passive infrared (PIR), ultrasonic (US) or dual technology (DT)
- Range from 450 sq. ft. to 2000 sq. ft. mounted on an 8 ft. to 12 ft. ceiling
- 8-second test mode to easily confirm proper operation
- Model with additional output (dry contact closure) available
- Non-volatile memory (saved changes are stored during loss of power)
- 20-24 VDC, Class 2 (PELV) low-voltage wiring

Occupancy Sensor / Overview

Stand-Alone Benefits of Using Occupancy Sensors

Reduced energy costs

Lutron occupancy sensors reduce energy consumption in building spaces by automatically shutting off the lights during periods of non-use.

Using Lutron occupancy sensors can eliminate 20% – 30% of lighting energy costs.

Convenience

You never have to worry about turning on or off the lights. Lutron occupancy sensors automatically turn them on and off when you enter or exit a restroom, a classroom, a conference room, a hallway, or your office.

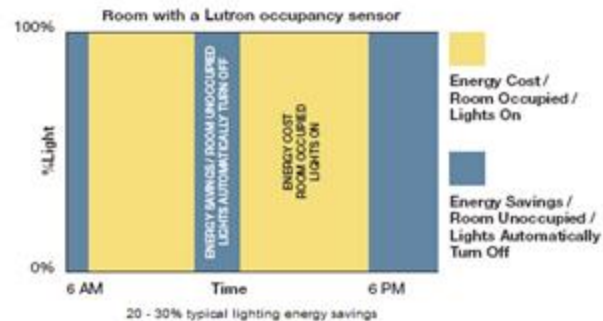
Obtain LEED™ certification points

LEED is a voluntary rating system sanctioned by the United States Green Building Council (USGBC) that provides a national guideline for what constitutes a "green" building. Efficient lighting controls may contribute to obtaining up to 22 points in 5 of 6 LEED credit categories. A minimum of 26 points is required for Leadership in Energy and Environmental Design certification. Lutron occupancy sensors help you meet the requirements for these certification points.



Comply with building energy codes

Energy codes play a key role in helping us reduce our energy consumption. They set the mandatory performance requirements for building construction. Most commercial energy codes have mandatory requirements that can be cost-effectively and conveniently met with the use of Lutron occupancy sensors.



Green Lighting Fixtures



Green Lighting Fixtures

Incandescent & Halogen

Fluorescent & CFL's

LED's

Incandescent & Halogen

- Incandescent fixtures can be “greened” by using dimmers, occupancy sensors, and/or some awareness.
- Halogen lamps are more efficient than standard incandescent lamps. Dimming & Sensors make them even better.
- They are the easiest and least expensive fixtures to control. 20-30% energy reductions can easily be achieved.
- They do not require you to buy new lights!!!

Fluorescent

- Fluorescent is incredibly energy efficient light sources. They do not need to be dimmed to reduce the energy
- Tougher to dim
- Questionable light quality “blah color”
- Mercury / Disposal issues

Fluorescent

- Fixtures that are made to use fluorescent lamps (bulbs) look and perform well.
- Fluorescent gets a “bad wrap” because of CFL’s
- Many fluorescent fixtures carry the Energy Star rating.
- Don’t like the Chicago cold weather
- Use with caution in your residence !!!!!!!!

CFL's

- CFL's (Compact Fluorescent Lamps) are typically used improperly
- Be aware of the size of the bulb you are replacing. Make sure the dimensions match or at least try to be close.
- Understand their color. Make sure they are warm in color. Understand Kelvin Temperatures.

LED's

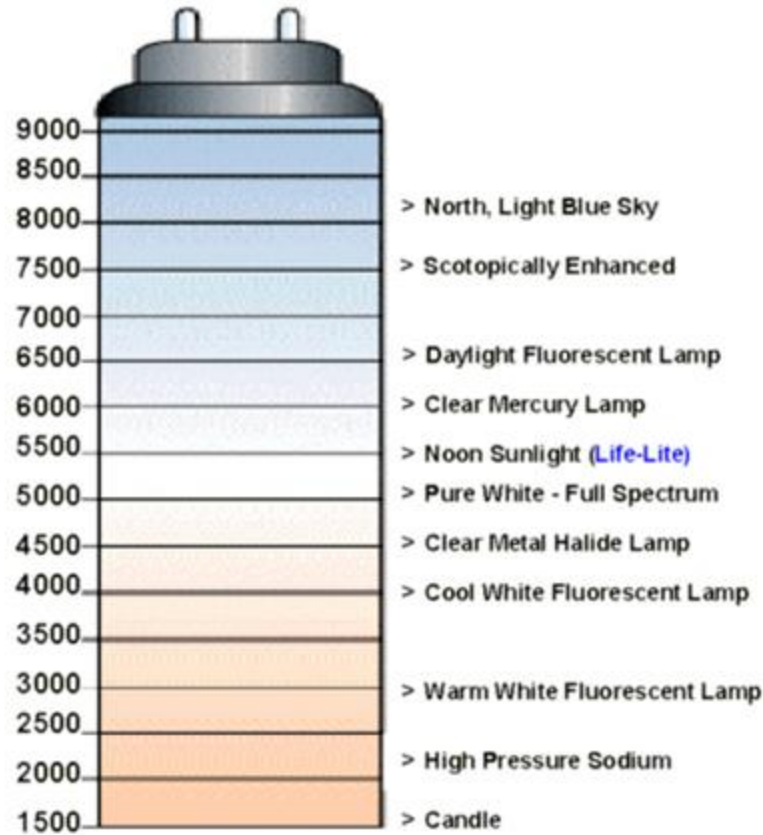
- LED's (Light Emitting Diodes) are the most energy efficient light source on the market today
- Very new technology. Hasn't been on the market long enough to be fully tested
- They DO create heat
- Can be difficult to control & dim
- Typically expensive

The Science

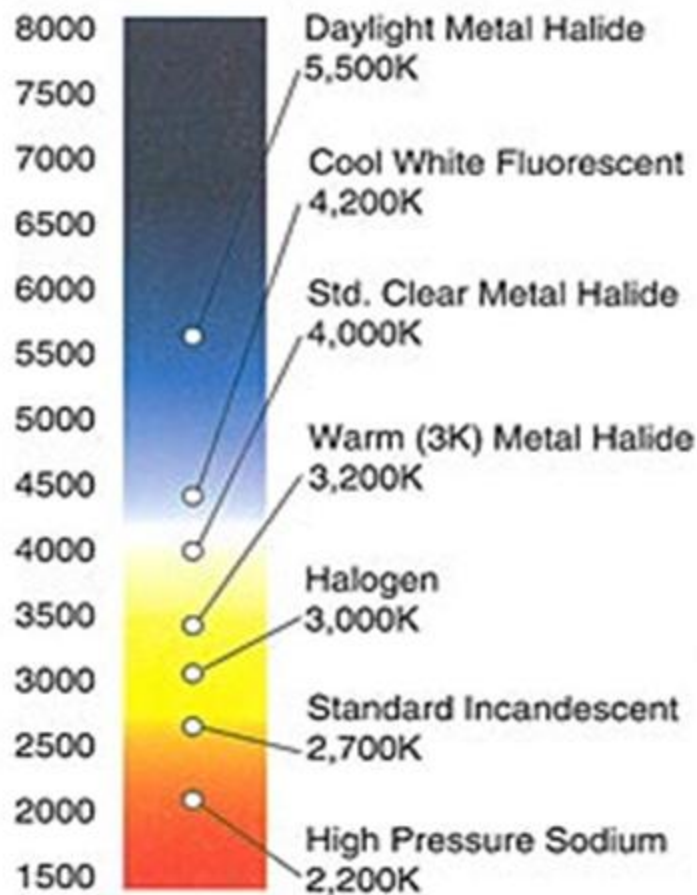
- White Light
- Kelvin Temperatures
- CRI
- The Math

- Lumens & Footcandles

White Light ?????



White Light ?????



Kelvin Temperatures

- The lighting world uses Kelvin temperatures to describe the color of the light source
- There are many colors of white.
- Residential colors are usually warm temperatures
- The LOWER the temperature the warmer the color. The HIGHER the temperature the cooler the color.

CRI (Color Rendering Index)

- CRI = Is a measurement of the ability of a light source to reproduce the colors of various objects in comparison to a natural light source.
- The measurement is given a rating between 0-100. 100 is the best. Or exactly equal.

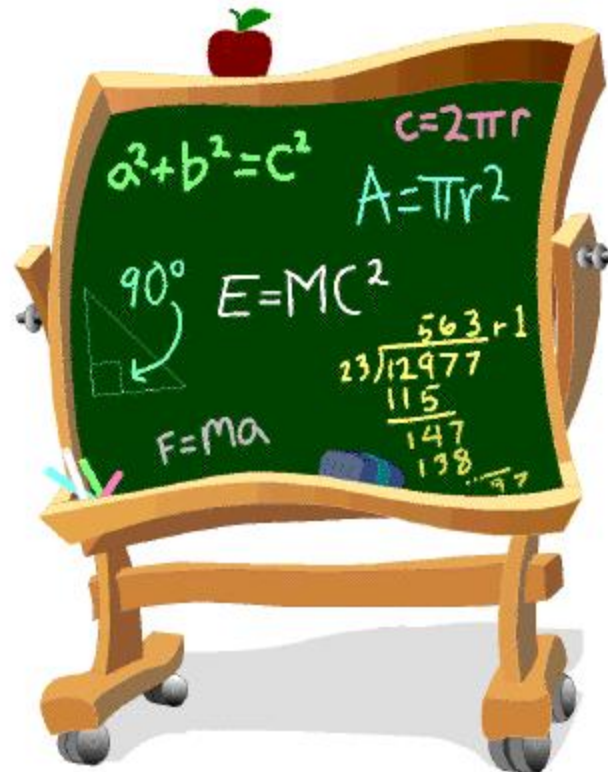
CRI (Color Rendering Index)

- Artificial light sources (Halogen, Incandescent, Fluorescent, & LED) do not provide 100% of the colors available.
- Halogens & Incandescents = 90% - 100% CRI
- Fluorescent = 60% – 85% CRI
- LED's = 70% - 90% CRI

CRI (Color Rendering Index)

- Warm Lamps – typically do better with warmer colors within the room. **Yellows, Reds, Oranges, Browns,**
- Cooler Lamps – typically do better with cooler colors within the room. **Blues & Greens, Purples**
- Warmer temperatures are softer feeling / Bass
- Cooler temperatures are crisper feeling / treble

The Math



The Math

- The electric company charges you for electricity using this formula:
- kWh x rate
- (kilowatt x hours) x (typically about \$.10)

The Math

- An example home:
 - You have **25 light fixtures** in your home.
 - Each fixture consumes **100 watts**
 - Each fixture is on for **10 hours** on average

The Math

Energy:

25 fixtures x 100 watts = 2,500 watts

2,500 watts = **2.5 kW** (kilowatts. Divide by 1000)

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2.5kW

- Time

- 10 hours x 365 days = 3650 hours per year

- **3,650h**

The Math

Energy:

25 fixtures x 100 watts = 2,500 watts

2,500 watts = 2.5 kW (kilowatts. Divide by 1000)

2.5kW

Time

10 hours x 365 days = 3,650 hours per year

3,650h

$$(\text{Energy}) \times (\text{Time}) = (2.5\text{kW}) \times (3,650\text{h}) = 9,125\text{kWh}$$

$$9,125\text{kWh} \times \$0.10 (\text{Rate}) = \$912.50$$

It costs \$912.50 to operate the (25) fixtures per year. *(This does not include the price for new bulbs or installation if this a commercial application)*