

## Some quick outdoor lighting tips

When switching to Outdoor Compact Fluorescent Light (OCFL) Bulbs, as shown below, you will not need the same wattage as an incandescent bulb. Help preserve dark skies by not over lighting an area because of a simple miscalculation.

The Department of Energy and Environmental Protection Agency's EnergyStar program have contributed the following table to assist in OCFL conversions.

More information is available at the EnergyStar Web site, [www.energystar.gov](http://www.energystar.gov).

| Incandescent Light Bulbs | Minimum Light Output | Energy Star Qualified Bulbs |
|--------------------------|----------------------|-----------------------------|
| Watts                    | Lumens               | Watts                       |
| 40                       | 450                  | 9-13                        |
| 60                       | 800                  | 13-15                       |
| 75                       | 1,100                | 18-25                       |
| 100                      | 1,600                | 23-30                       |
| 150                      | 2,600                | 30-52                       |

Data from Energy Star Web site, [http://www.energystar.gov/index.cfm?c=cfls.pr\\_cfls](http://www.energystar.gov/index.cfm?c=cfls.pr_cfls).

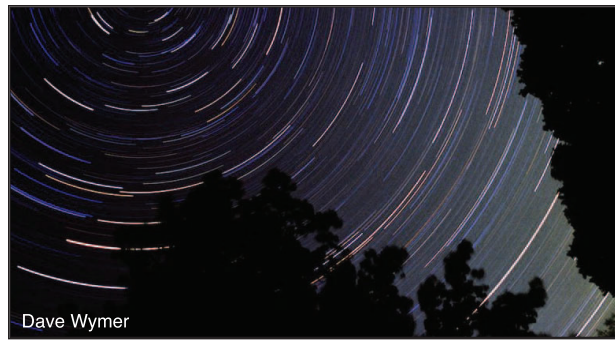


Look for the IDA Fixture Seal of Approval to make sure you are buying a true dark-sky friendly fixture.

International Dark-Sky Association images may only be used for noncommercial, educational purposes and must compliment IDA's mission to preserve and protect our night skies through quality outdoor lighting

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U.S. Lighting Market Characterization, Volume I: National Lighting Inventory and Energy Consumption Estimate—Received by Building Technologies Program; Office of Energy Efficiency and Renewable Energy; U.S. Department of Energy; Prepared by Navigant Consulting Inc. 1801 K Street, NW Suite 500 Washington DC, 20006 with XENERGY, Inc. Burlington, MA; September 2002.



The International Dark-Sky Association (IDA), is an educational organization that seeks to preserve the natural night skies worldwide. Light pollution is an increasing problem threatening astronomical facilities, ecologically sensitive habitats, all wildlife, our energy use as well as our human heritage. Light pollution is excessive and inappropriate artificial light. The four components of light pollution are often combined and overlapping:

- **Urban sky glow**—the brightening of the night sky over inhabited areas.
- **Light trespass**—light falling where it is not intended, wanted, or needed.
- **Glare**—excessive brightness which causes visual discomfort. High levels of glare can decrease visibility.
- **Clutter**—bright, confusing, and excessive groupings of light sources, commonly found in over-lit urban areas. The proliferation of clutter contributes to urban sky glow, trespass, and glare.

Keeping lights on in unoccupied buildings, outdoor lights pointing up to the sky or unshielded lights create sky glow. Visit the IDA Web site at [www.darksky.org](http://www.darksky.org) to learn more about the causes of light pollution and what you can do to keep the skies dark.

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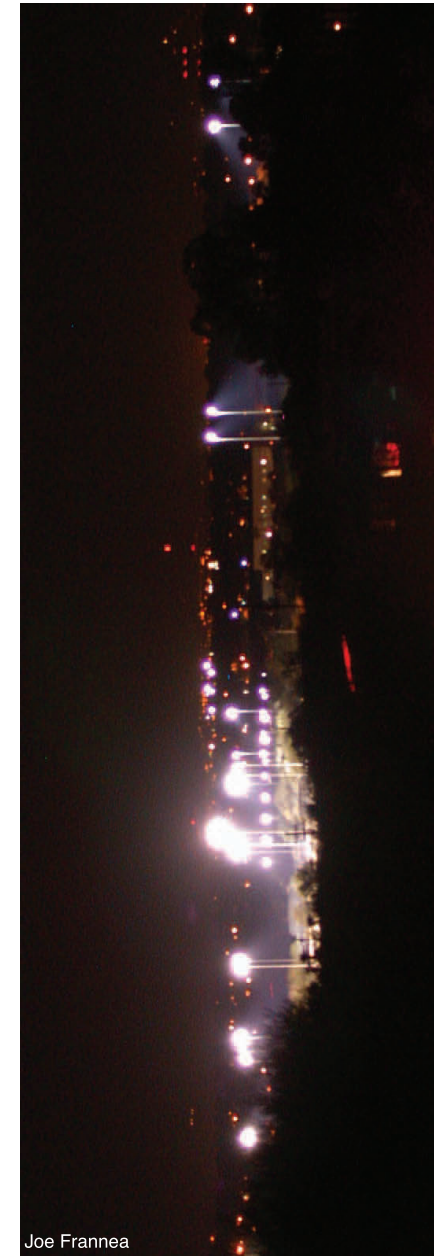
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## International Dark-Sky Association

*To preserve and protect the nighttime environment and our heritage of dark skies through quality outdoor lighting.*

## Light Pollution and Energy



Save energy and enjoy the nighttime sky

Joe Frannea

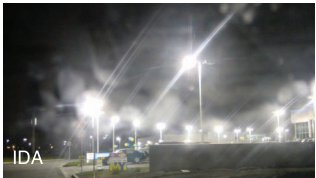
## What is waste?



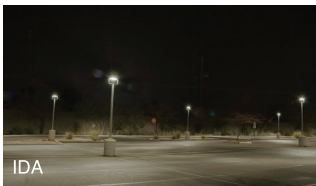
This office building depicts wasted energy. The office is empty, but all the lights are on. This type of illumination contributes to the general sky glow of the city as well as wasting energy. Is the most efficient use of your tax dollars to keep buildings lit when they are empty?

Being dark sky friendly does not mean no light. It means using the light that you need for a particular task in the most efficient manner possible.

## Good Lighting vs. Bad Lighting



The photo on the top shows light shining into the sky and creating glare. There are also many more lights being used. The parking lot on the bottom shows shielded lighting. Notice how fewer lights illuminate an area of similar size and without glare.



## What is being done?

Municipalities are exploring new ways to save money and keep the skies as natural as possible. Dark sky friendly fixtures are similarly priced as traditional fixtures or the costs are off set through energy efficiency. Shielded lighting usually requires a lower wattage lamp because all the light from the fixture is pointed downward where it is needed.



R. Dechesne/Royal Astronomical Society of Canada  
© F. Dechesne 2001  
Notice the glare of the old drop lens fixtures in the background compared to the new flat-lens fixtures in foreground, Calgary, Alberta, Canada.

Calgary, Alberta, Canada switched to shielded lighting in order to save money on their streetlight electricity consumption. By retrofitting their roadway lighting with flat lens fixtures, Calgary will see cost savings from reduced energy consumption of approximately \$1.7 million a year.

Many cities are using new solid state lighting or light emitting diodes (LED) technology and solar power. These are terrific alternatives in terms of energy and costs savings. To be truly effective and not create sky glow, glare or light trespass, an LED or solar lamp must to be pointed downward, fully shielded to emit no light above the 90 degree angle. A globe light “glare bomb” can still be a “glare bomb” even if it is an LED or solar powered lamp.



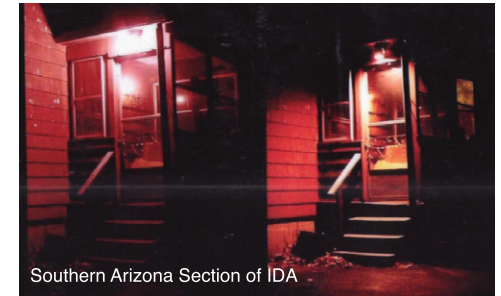
IDA  
Low Pressure Sodium lighting in the background and LED in the foreground

## Carbon footprint

Wasted outdoor lighting, that shines directly upward, is estimated at 22,000 gigawatt-hours a year. At an average of \$.10 per kilowatt-hour the cost of that wasted energy is \$2.2 billion a year. In terms of how that affects our carbon footprint, here's the math:

- 3,412 Btu to generate one kilowatt-hour
- 1 ton of coal = 20.1 million Btu
- 1 barrel of oil = 5.8 million Btu

- 3.6 million tons of coal, or 12.9 million barrels of oil are wasted every year to generate the energy for this lost light. That's almost 451.8 million gallons of gasoline wasted.



Southern Arizona Section of IDA  
By shielding the light (right side), the bulb was reduced from 60 watts to 40 watts, a 33% savings.

## Solutions

IDA believes that there are solutions to these issues:

- Shield and lower the wattage of all outdoor lighting: Homeowners, businesses, and cities.
- Use only the light you need to get the job done.
- Use timers, dimmers, and sensors to darken unoccupied areas. Shut off the lights when you can.

A shielded light uses less wattage and saves everyone money, reduces our energy use and shrinks our carbon footprint. Work with your neighbors and local government to keep the light on the ground and the skies natural. This is a win-win situation for everyone. You save money while preserving a valuable natural resource.



Malcolm Smith  
This fully shielded lighting with motion sensors safely light the walkway and saves energy.