



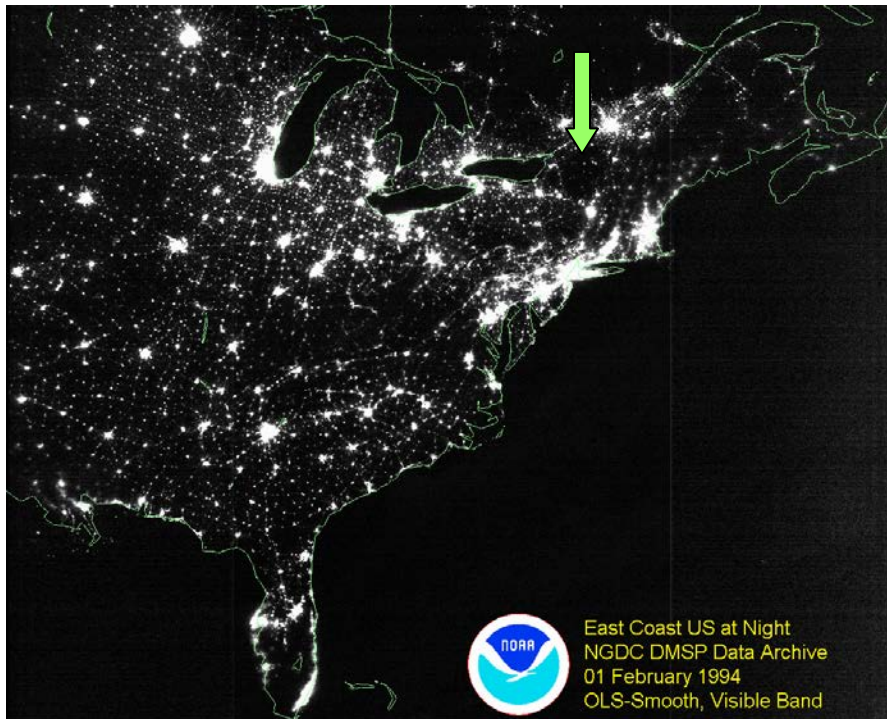
# Adirondack Park Agency

## PROJECT GUIDELINES: LIGHTING

**Objective:** Limit artificial outdoor lighting to maintain the dark skies of the Adirondack Park.

### Background:

The Adirondack Park, as seen in nighttime images of the United States from space, stands out as a sizeable dark section ringed by the lights of more densely populated areas.



A dark sky is a valuable natural resource. Maintaining this resource does not mean prohibiting nighttime light; instead, it involves using only light that is necessary and in the most efficient manner possible.

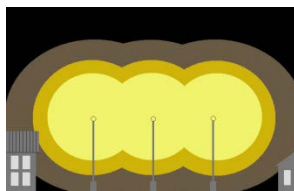
Light pollution can occur in different forms, including trespass, over-illumination, glare, and sky glow, and may lead to a variety of concerns, including impacts to:

- **Property Enjoyment** – Light trespass onto one property from another can diminish the view of the nighttime sky by reducing the visible number and clarity of celestial objects.

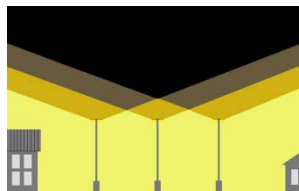
- **Energy Consumption** – Wasted outdoor light increases energy costs and releases carbon dioxide into the atmosphere each year, contributing to global climate change.
- **Safety** – Extra lighting does not necessarily enhance security. For example, improper or excessive lighting can obscure night vision and partially blind drivers or pedestrians.
- **Wildlife and Fish** – Artificial light can disorient and disrupt the biorhythms of fish and wildlife. In addition, nighttime lighting can be deadly to insects on which birds and other species prey.
- **Water Quality** – Light pollution around waterbodies can inhibit plankton from eating surface algae, increasing the risk of algal blooms that kill aquatic plants and lower water quality.
- **Vegetation** – Light pollution has been known to cause trees to bud prematurely and flowers to cease blooming.

### **General Guidelines:**

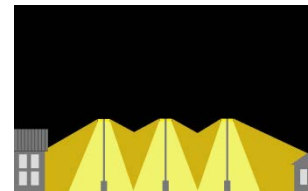
- Use artificial outdoor lighting only when necessary, with the minimum intensity necessary, and direct the light carefully to where it is needed.
- Install timers and sensors to turn off lights when they are not needed. Darken unoccupied areas with the use of dimmers.
- Where possible, install reflectors instead of lights (for example, to outline a driveway).
- Use light fixtures that are full-cutoff and/or fully-shielded to direct light downward and not across property lines or into the sky.



**Non Cut-off  
(Avoid)**



**Semi Cut-off**



**Full Cut-off  
(Preferred)**

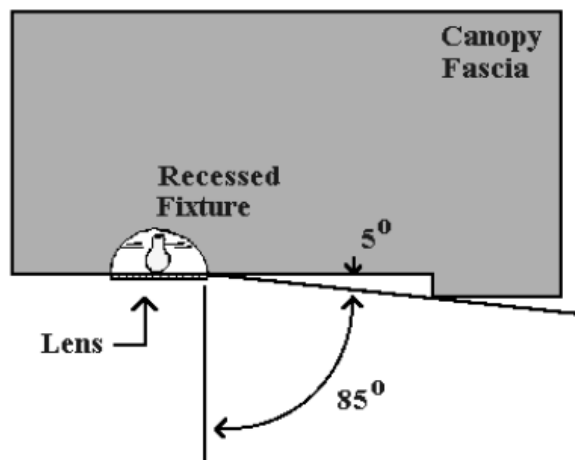
- Use available energy-efficient technology such as Light Emitting Diodes (LEDs) and Compact Fluorescent Light bulbs (CFLs).

- Use lighting fixtures with the International Dark-Sky Association's (IDA) Fixture Seal of Approval.<sup>1</sup>
- Use lighting fixtures with the EnergyStar label.<sup>2</sup>

### **Specific Guidelines:**

#### **1. Businesses**

- Business illumination levels should be no more than 10 times the illumination level of the surrounding area.
- Light fixtures within business canopies should be completely recessed in the canopy and should contain a "skirt" around the edge of the canopy, as depicted below.

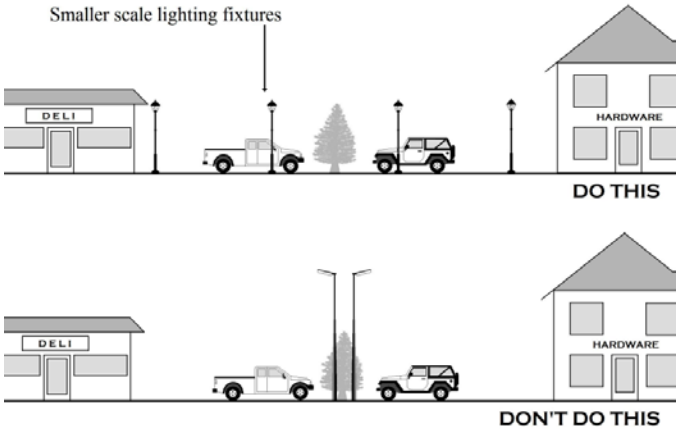


International Dark Sky Association, Service Station/Convenience Store Lighting (December 1998). Available at <http://www.darksky.org/assets/documents/is145.pdf>.

- Delineate key safety problem areas, such as the edge of steps, with white paint to keep lighting levels at a minimum.
- Space lighting in parking lots so as to avoid creating shadows and glare that can block a driver's view of a pedestrian.

<sup>1</sup> The IDA is a non-profit organization founded in 1988 to address the issue of light pollution. The IDA's Fixture Seal of approval program works with manufacturers to produce energy efficient, fully shielded lighting.

<sup>2</sup> EnergyStar is a U.S. Environmental Protection Agency program created to identify and promote energy-efficient products and buildings.



- Footpath lighting, if necessary for safety, should be low voltage, full-cutoff, and only a few feet off the ground.
- **Service station** pump islands should have a 20 footcandle limit.
- **Campgrounds** may wish to discourage the use of bright flashlights and camping lanterns that are not full-cutoff.

**2. Telecommunication Towers and Other Tall Structures**

- The Federal Aviation Administration (FAA) requires the lighting of towers that are obstructions to air navigation. With this in mind, new towers should be limited to a height that does not require lighting whenever possible. If lighting is necessary, it should be designed to meet all requirements while minimizing the creation of light pollution.

**3. High Security Facilities**

- Lighting at certain high security facilities, such as airports and prisons, is of paramount importance, but should be tailored as possible to minimize light pollution.

**Definitions:**<sup>3</sup>

**Clutter** – bright, confusing, and excessive groupings of light sources, commonly found in over-lit urban areas. The proliferation of clutter contributes to sky glow, trespass, and glare. [Source: IDA]

<sup>3</sup> Except where indicated, definitions are reprinted from the National Lighting Product Information Program. See <http://www.lrc.rpi.edu/programs/NLPIP/glossary.asp>.

**Fixture (or luminaire)** - A complete lighting unit consisting of a lamp or lamps and the parts designed to distribute the light, to position and protect the lamp(s), and to connect the lamp(s) to the power supply.

**Footcandle (fc)** – A measure of illuminance in lumens per square foot. One footcandle equals 10.76 lux, although for convenience 10 lux commonly is used as the equivalent.

**Full-cutoff** - IESNA classification that describes a lighting fixture having a light distribution in which zero candela intensity occurs at or above an angle of 90° above nadir. Additionally, the candela per 1000 lamp lumens does not numerically exceed 100 (10%) at or above a vertical angle of 80° above nadir. This applies to all lateral angles around the lighting fixture.

**Fully-shielded** - A lighting fixture that emits no direct uplight, but which has no limitation on the intensity in the region between 80° and 90°.

**Glare** – The sensation produced by luminances within the visual field that are sufficiently greater than the luminance to which the eyes are adapted, which causes annoyance, discomfort, or loss in visual performance and visibility.

**Light pollution** – An unwanted consequence of outdoor lighting that includes such effects as sky glow, light trespass, and glare.

**Light trespass** – A undesirable condition in which exterior light is cast where it is not wanted.

**Lumen (lm)** - A unit measurement of the rate at which a lamp produces light. A lamp's light output rating expresses the total amount of light emitted in all directions per unit time. Ratings of initial light output provided by manufacturers express the total light output after 100 hours of operation.

**Luminaire** – see Fixture

**Lux (lx)** – A measure of illuminance in lumens per square meter. One lux equals 0.093 footcandle.

**Nadir** – In the lighting discipline, nadir is the angle pointing directly downward from the luminaire, or 0°. Nadir is opposite the zenith.

**Sky glow** – Brightening of the sky caused by outdoor lighting and natural atmospheric and celestial factors.

**For Further Information:**

*EnergyStar ([www.energystar.gov](http://www.energystar.gov))*

*Illuminating Engineering Society of North America ([www.iesna.org](http://www.iesna.org))*

*International Dark-Sky Association ([www.darksky.org](http://www.darksky.org))*

*Lighting Research Center ([www.lrc.rpi.edu](http://www.lrc.rpi.edu))*

*National Lighting Product Information Program ([www.lrc.rpi.edu/programs/NLPIP](http://www.lrc.rpi.edu/programs/NLPIP))*