

LED STREET LIGHTING

Fact Sheet

“Despite the energy efficiency benefits, some LED lights are harmful when used as street lighting.”
– American Medical Association, 2016

• LED Lights

LEDs or “Light Emitting Diodes” are semi-conductors that produce light from electricity. LED lights last longer and use less electricity than traditional light sources because most of the energy is used to produce light, not heat. This efficiency, combined with the facts that LED lights come in a variety of colors and are more directional, have made them appealing for many different applications.



• LED Lighting Specifications

LED lights come in a range of colors, from those that mimic full-spectrum daylight to those that closely resemble the warmer glow of an incandescent bulb. Correlated color temperature (CCT) indicates the color appearance of a light source and is measured in degrees of Kelvin (K) on a scale from 1,000 to 10,000. Commercial and residential lighting CCT usually falls somewhere between 2000K and 6500K. At the lower end of the scale (2000K - 3000K) the light produced has a warmer glow. CCTs between 3000K-5000K mimic daylight and have a harsh, white-blue appearance.

Newer street lighting options that emit healthier non-blue/white light include Phosphor-Converted Amber (PCA) LEDs, which convert blue light to amber, and Narrow-Band Amber (NBA) LEDs which utilize a new and very energy-efficient technology to emit mostly yellow/amber colors. As their price comes down over time, these bulbs will be the best choices for street lighting, addressing the negative effects of full spectrum white LEDs that negatively impact human health and wildlife.

• Proliferation of LED Lighting

Federal, state and local initiatives for energy efficiency and conservation have strongly encouraged the use of LED lighting to replace the older low pressure sodium (LPS) lamps, which produce almost exclusively warm yellow light. To date, approximately 10% of U.S. street lighting has been converted to LED technology, with efforts underway to further accelerate this conversion. While energy saving efforts are very important, the long-term health effects of human exposure to LED lighting have not been fully studied.

• Known Health Issues Associated with “Blue Light” Exposure

Sunlight contains a variety of red, orange, yellow, green and blue light rays, each with its own wavelength and energy level. According to the American Medical Association, LED streetlights with higher levels of blue light can suppress melatonin production during the night, negatively impacting the body’s circadian rhythm and leading to reduced and poorer quality sleep, excessive sleepiness during the day and reduced attention spans. Chronic exposure to blue light, which reaches deep into the eye, is associated with retinal cell damage and age-related macular degeneration (AMD).

(Over, please)

According to a 2015 Harvard Health Publication, “Study after study has linked the night shift and exposure to light at night to several types of cancer (breast, prostate), diabetes, heart disease and obesity.” It goes on to state that “while any kind of light can suppress the secretion of melatonin, blue light does so more powerfully.” A 2017 study conducted by researchers at the Harvard School of Public Health found that “exposure to residential outdoor light at night may contribute to invasive breast cancer risk.”

• **Involuntary Exposure**

Of course, LED street lighting is not the only source of blue light exposure in modern life. Interior lights, television screens, smart phones, tablets, computer monitors and other devices give off various levels of blue light. However, these types of exposures are often within the control of the user. LED street light installations take control away from residents living, working and traveling nearby.

• **The Medical Community’s Recommendations for Addressing Blue Light Exposure**

The AMA’s findings on the negative impacts of light exposure led them to recommend a maximum light temperature for streetlights of 3000K. Other recommendations include making sure that lights are focused where they are needed most in order to minimize skyglow, glare and light trespass. Installers have also found success using a mix of lighting options, such as using more intense LED lights only at intersections or other busy traffic areas, and using lower correlated color temperature (CCT) lighting in residential settings.

• **Environmental Impacts**

While human health impacts from blue LED lights are of chief concern, the detrimental effects of improper lighting are not limited to humans. Sixty percent of animals (including domesticated pets) are nocturnal and can be potentially adversely affected by involuntary exposure. Migratory birds and fish, nesting turtles, and other animal populations have also been affected. Beneficial insects are attracted to blue-rich lighting, circling under them until they die.

• **Case Studies From Other Communities**

A number of cities and towns that installed LED lighting have received complaints from residents who dislike brighter, cooler temperature lighting for both health and aesthetic reasons. In some instances, local government have had to replace bulbs and/or fixtures, incurring unnecessary and costly expenses. In Davis, California, city leaders spent \$350,000 to replace hundreds of LED streetlights after residents complained.

The city of Lake Worth, Florida replaced over 4,000 sodium streetlights with low-CCT LEDs that had an amber glow. City manager Michael Bornstein said “We found a color that made sense for the health of our city, and we’re proud of the choice we’ve made.” City Planner Matt Coogan in Gloucester, MA, said that aesthetics and the health impacts of LEDs were factors in their decision to use lower temperature LEDs. “We didn’t want to get 10 or 15 years down the road and find out that we had exposed our people to a health risk,” he said.

This fact sheet was produced by Grassroots Environmental Education,
a non-profit environmental health organization