

December 29, 2021

**BY EMAIL**

Wade Kapszukiewicz, Mayor  
Toledo, Ohio  
mayor@toledo.oh.gov

**Re: The LED Fraud**

Dear Wade Kapszukiewicz,

The natural night is a fundamental resource that is critical to the proper functioning of humans and nearly all biological systems. Artificial light is a pollutant that damages the natural night resource and greatly increases sickness, risk of cancer, mood disorders and premature births.<sup>1</sup>

The claim that Light Emitting Diodes are energy efficient is fraudulent. According to the US Department of Energy's website, energy efficiency means "using less energy to get the same job done."<sup>2</sup> The job, in the case of streetlighting, is to provide uniform illumination with minimal harm. LEDs do not produce uniform illumination<sup>3</sup>, but rather they emit radiation from a flat surface which creates a mix of energies that are not uniform. Since LEDs do not do the same job as an incandescent or High-Pressure Sodium, **the claim that LEDs are energy efficient cannot be made.**

Consider the diagram of an incandescent light and LED radiation device as shown in Figure 1.

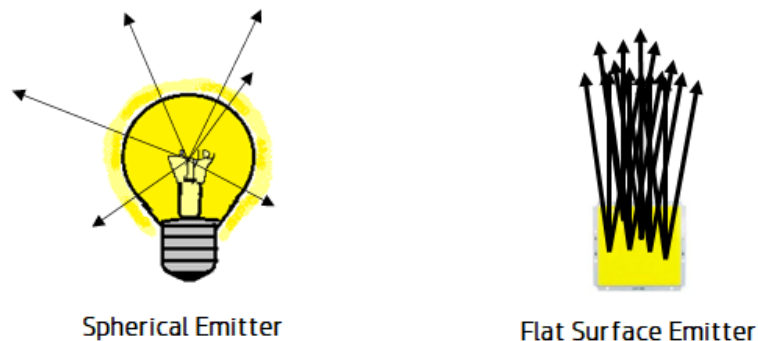


Figure 1 - Spherical vs. Flat Surface Emitter

<sup>1</sup> <https://www.softlights.org/resources>

<sup>2</sup> [https://www.energystar.gov/about/about\\_energy\\_efficiency](https://www.energystar.gov/about/about_energy_efficiency)

<sup>3</sup> <https://ieeexplore.ieee.org/document/8879542>

As shown in Figure 1, a spherical emitter sends light in all directions in space. Because of the curvature of the emitter, the light rays do not overlap, and the radiation is spatially, spectrally, and temporally uniform. A flat surface emitter, such as an LED, sends light only in the forward direction. The light rays are confined to an 'escape angle' which is determined by the physical characteristics of the chip. There are thus overlapping rays, with the most overlap being in the center of the chip, and the least overlap being on the edges. The result is that every point in space has different spatial, spectral, and temporal properties. This non-uniform radiation profile is not suitable for illumination and not compatible with the human nervous system. **An energy efficiency comparison between an incandescent or High-Pressure Sodium and an LED cannot be made.**

Figure 2 shows the uniform spatial energy from candles, incandescent and High-Pressure Sodium versus the non-uniform spatial energy from an LED and LASER. The intense peak of energy will cause eye damage will overload the nerve signals to the brain because the information is not uniform.

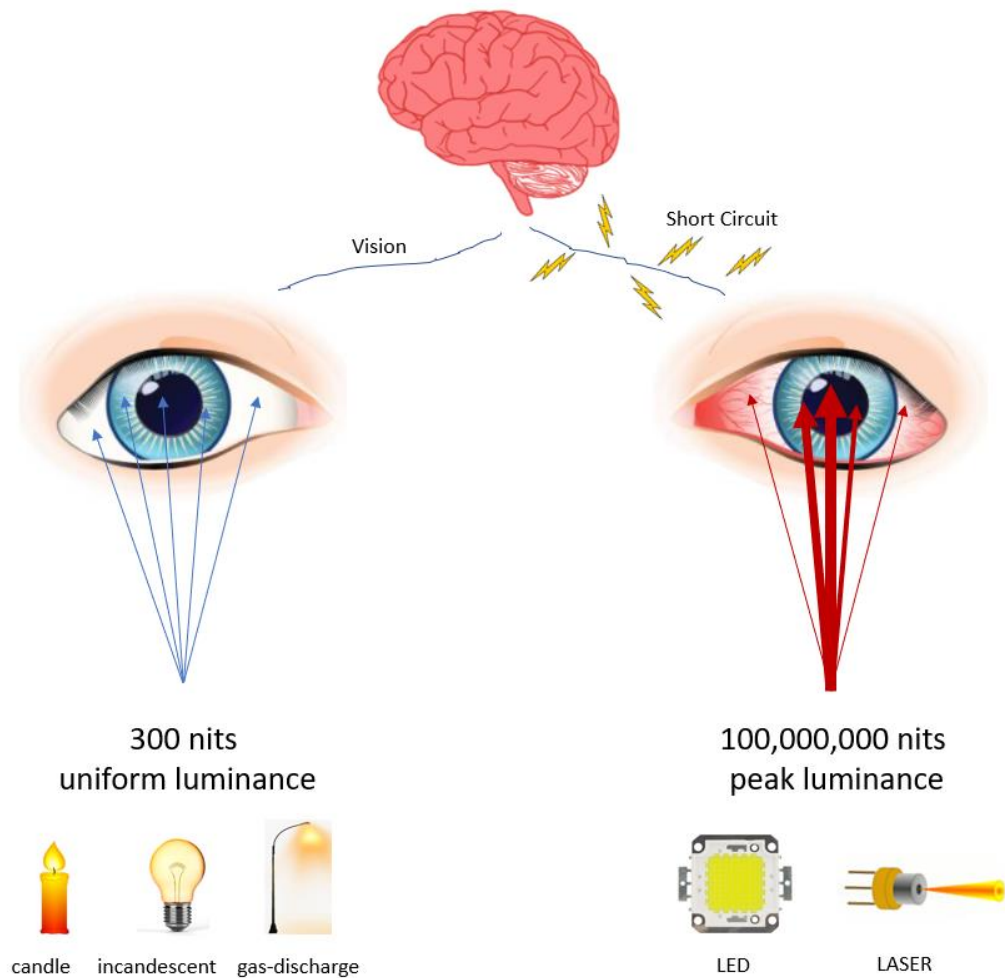


Figure 2 - Spatially Uniform v. Non-Uniform Radiation

The regulatory meaning of light and illumination only applies to emitters that produce spatially uniform visible radiation. Figure 3 is a diagram showing the categorization of radiation.

## Regulatory Meaning of Light and Illumination

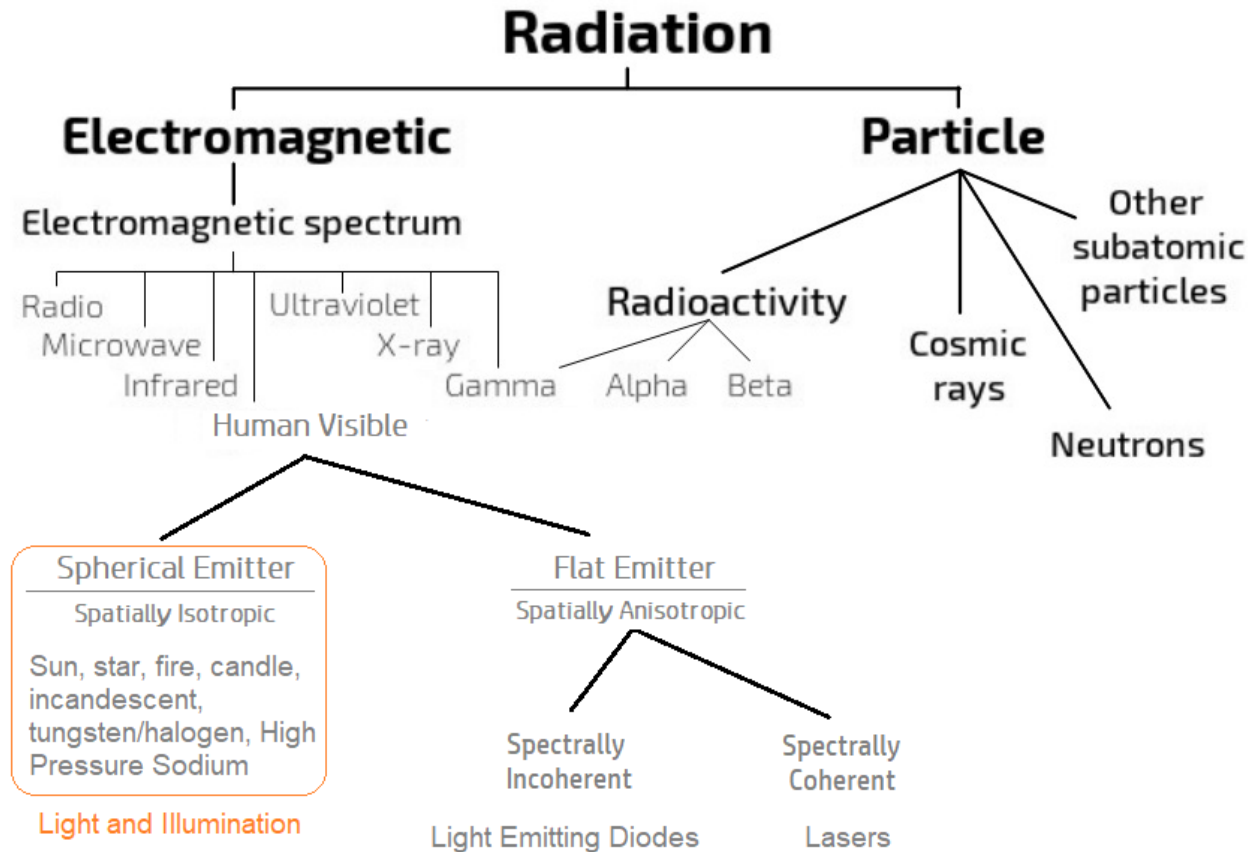


Figure 3 - Radiation Categories

A standard such as the Illuminating Engineering Society Recommended Practice for Design and Maintenance for Roadway Parking Facility Lighting (IES RP-8-18) is applicable only to the standard regulatory meaning of light and illumination and cannot be used for LED radiation devices.

LED radiation is discriminatory because it interferes with human nerves and disrupts major life functions such as seeing, thinking, and concentrating for people with disabilities, such as those with epilepsy, autism, PTSD, migraines, bipolar disorder, and others. LED radiation prevents safe access to public services such as roads, sidewalks, and government facilities because it triggers epileptic seizures, migraines, psychological trauma, and thoughts of suicide.<sup>4</sup> Use of LED radiation devices likely violates the federal Americans with Disabilities Act.

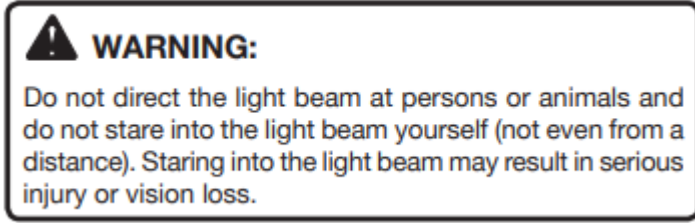
<sup>4</sup> <https://www.softlights.org/stories>

LED radiation is toxic and dangerous because it can have an exceedingly high peak radiance and because the emitted radiance is not uniform. As an example of how dangerous LED radiation is, consider this warning shown in Figure 4 from the company Gear Light.



Figure 4 - LED Flashlight

As another example, the operator's manual for the Ryobi P705 Flashlight includes the following: "WARNING: Do not direct the light beam at persons or animals and do not stare into the beam yourself (not even from a distance) Staring into the light beam may result in serious injury or vision loss."

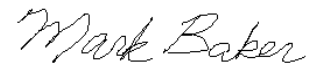


Clearly neither flashlight can be safely used in a dark environment, as there is no feasible way to protect every approaching person or animal from being hit in the eye with the light beam. The warnings also refer to children, who along with infants are an identified high-risk population vulnerable to LED-exposure harm. Babies often lack an adult's automatic, self-protective aversion response to bright or intense light, and will stare directly at the source. There is nothing on an LED streetlight to prevent babies or children from looking straight into the LED emitter from a stroller or car seat, leaving them at risk of irreversible eye damage.

LED streetlights are a misrepresented, unsafe consumer product. The city is the victim of fraud because the utility companies know all about these hazards and false claims of energy savings, and yet choose to sell these toxic LED devices anyways. LED visible radiation exposure is causing catastrophic physical harm, subjecting at-risk individuals to illness and injury, and plunging formerly healthy, independent people into crisis levels of stress, hopelessness, psychological trauma, and persistent thoughts of suicide.

LED radiation devices must not be used for the task of illumination because LED devices are not safe, they are discriminatory, and they are not energy efficient. The LED fraud is detailed on our website at [www.softlights.org/led-fraud](http://www.softlights.org/led-fraud). The city was not provided the full details by the utility company about the dangers of LED radiation. The medical reports of injury from LED radiation devices are happening now, and shields, diffusers or lower CCT will not mitigate the non-uniform spatial energy of LED radiation. This letter should provide a compelling reason for the city to hold the utility companies responsible, protect the natural night resource, eliminate the liability of LED radiation devices, and protect the health and safety of the public.

Sincerely,

A handwritten signature in black ink that reads "Mark Baker". The signature is written in a cursive style with a large, stylized initial "M".

Mark Baker  
President  
Soft Lights Foundation  
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[mbaker@softlights.org](mailto:mbaker@softlights.org)