

December 25, 2021

BY EMAIL

Ruskin Hartley, President
International Dark-Sky Association
ruskin@darksky.org

Re: Spatially Anisotropic Visible-Radiation Devices

Dear Ruskin Hartley,

We wish to alert the International Dark-Sky Association of the fraudulent or deceitful statements being made by the IDA regarding LED radiation devices. The IDA appears to be publicly and purposely misstating and withholding crucial information regarding LED radiation devices

According to the US Department of Energy's website, energy efficiency means "using less energy to get the same job done."¹ The job is to provide uniform illumination with minimal harm. LEDs do not produce uniform illumination², 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. LEDs are simply a low quality, toxic, hazardous, and discriminatory type of visible radiation.

Figure 1 is a diagram showing the categorization of radiation and shows that *light* and *illumination* are spatially isotropic radiation in the human visible portion of the electromagnetic spectrum. Radiation emitted by LEDs do meet the regulatory meaning for the purpose of using light for illumination.

¹ https://www.energystar.gov/about/about_energy_efficiency

² <https://ieeexplore.ieee.org/document/8879542>

Regulatory Meaning of Light and Illumination

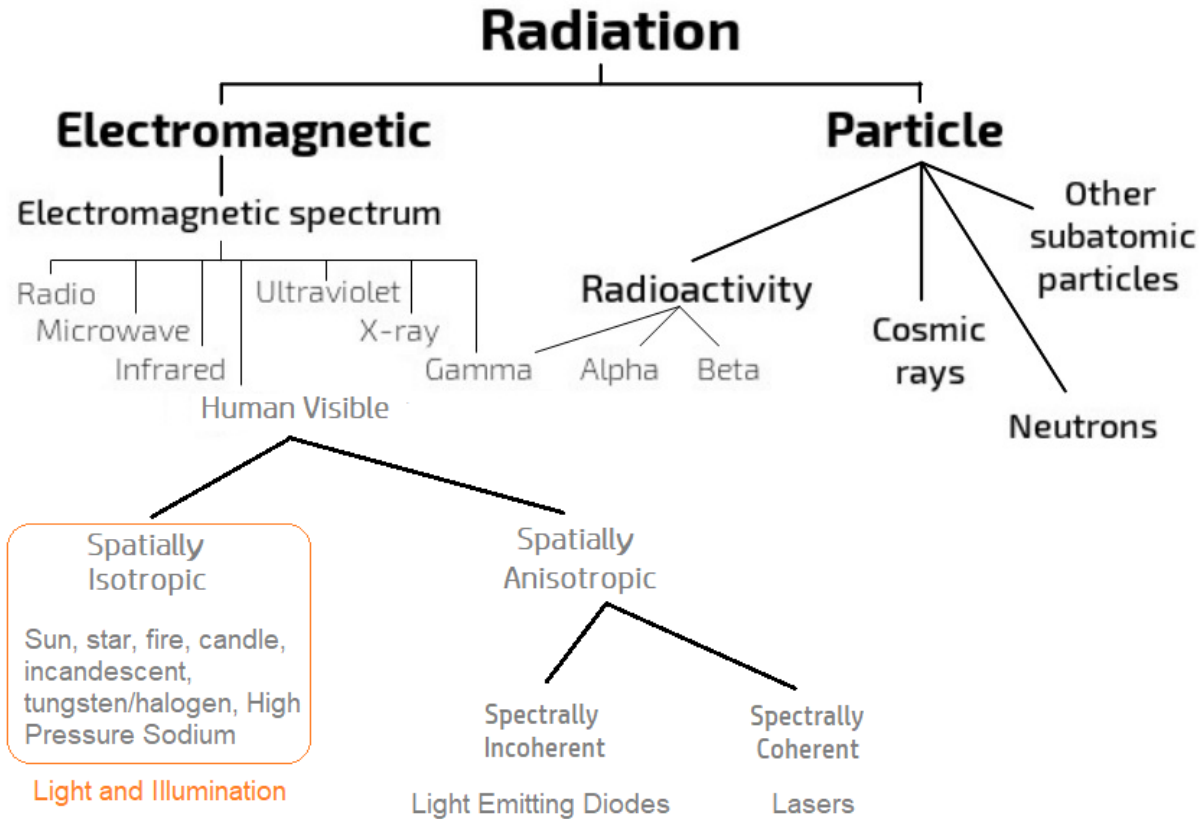


Figure 1 - Radiation Types

The IDA has made several statements on its website that we find to be fraudulent or deceitful.

“Early LEDs were also energy-inefficient”³ – This statement makes no comparison to a baseline of energy efficiency. Light Emitting Diodes emit visible radiation from a flat chip, producing a spatial radiation profile never before seen in human history. To state that LEDs, as a completely new product with nothing to compare to, as energy-inefficient is not possible.

“Put simply, LEDs are very small light bulbs that fit into an electrical circuit.”⁴ – LEDs are not illumination devices. LEDs emit visible radiation that is non-uniform, thereby rendering them incapable of delivering the property of uniform illumination that is necessary to be called a light bulb.

“The improved energy efficiency of LEDs means that, coupled with modern luminaire design, these lights allow for lower illumination levels without compromising safety.”⁵ – LEDs are toxic, dangerous, and discriminatory. The statement that LEDs do not compromise safety is false, as LEDs

³ <https://www.darksky.org/our-work/lighting/lighting-for-citizens/led-guide/>

⁴ <https://www.darksky.org/our-work/lighting/lighting-for-citizens/led-guide/>

⁵ <https://www.darksky.org/our-work/lighting/lighting-for-citizens/led-guide/>

cause eye damage, sickness, epileptic seizures, migraines, psychological trauma, and thoughts of suicide. Since LEDs do not provide uniform illumination and produce high glare, vision and thus safety is reduced by LEDs.

“Manufacturers now produce LEDs with “warm” color qualities at high energy efficiency”⁶ – The use of the phrase “high energy efficiency” is fraudulent if the comparison is against visible radiation devices that emit uniform illumination.

The IDA attempts to both promote LEDs and support the LED cartel by using three statements on the IDA website. **A) To minimize negative environmental impacts, IDA recommends using lamps rated at 2200K CCT, Phosphor-Converted Amber LED, or some filtered LED.⁷ and B) Use “warm-white” or filtered LEDs(CCT ≤ 3000 K; S/P ratio ≤ 1.2) to minimize blue light emission.⁸ and C) In 2014, the FSA program began requiring lighting that has a “correlated color temperature” CCT of 3,000 and lower (up to 3220K actual measured value – ANSI C78.377)⁹**

We assert that the IDA uses 2200K, 3000K and 3220K on three different web pages to appease the lighting industry and the Illuminating Engineering Society. And, as the IDA knows or should know, Correlated Color Temperature cannot even be used for LED radiation devices as LEDs do not emit spatially uniform radiation and a single CCT cannot be assigned to an LED.

As we understand it, the IDA’s Fixture Seal of Approval program charges lighting companies a fee to earn the Fixture Seal of Approval. This fee is apparently secret and not posted on the IDA’s website. The FSA program allows these companies to submit LED radiation devices which are known to be toxic, hazardous, and discriminatory and, for a fee, allows the company to use the IDA FSA seal. This is a liability issue for the IDA, as incandescent light bulbs and High-Pressure Sodium lighting provided safer uniform illumination and HPS has a color temperature of approximately 2000 Kelvin, meaning low blue content. The IDA, by acquiescing to industry demands, now allows LED lights with up to 3220 Kelvin which greatly **increases** light pollution because of the high blue content.

As an example of how dangerous LED radiation is, consider this warning shown in Figure 2 from the company Gear Light.



Figure 2 - LED Flashlight

⁶ <https://www.darksky.org/our-work/lighting/lighting-for-citizens/led-guide/>

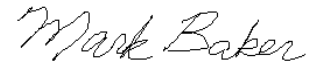
⁷ <https://www.darksky.org/our-work/lighting/values-centered-outdoor-lighting/>

⁸ <https://www.darksky.org/our-work/lighting/lighting-for-citizens/led-guide/>

⁹ <https://www.darksky.org/our-work/lighting/lighting-for-industry/fsa/>

In summary, LED radiation devices increase light pollution because of the directed nature of the radiation and because of the high levels of 450nm wavelength energies. LED radiation devices cause injury and harm to humans. LED radiation devices are not energy efficient compared to incandescent or HPS because LEDs do not produce a uniform spatial profile. By recommending less than 3000K and less than 2200K CCT in different areas of the IDA's website, the IDA has shown that appeasing the LED cartel is more important than protecting the natural night or public health.

Sincerely,

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

Mark Baker
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