

March 1, 2022

BY EMAIL

Steve Baker, CEO
Indiana Michigan Power
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Re: The LED Fraud

Dear Steve Baker,

We are contacting you about Indiana Michigan Power's deceitful and fraudulent claims regarding the supposed energy efficiency of LED light bulbs. Figure 1 shows the I&M claims.¹

Have you tried the latest in energy-efficient lighting technology? Light-emitting diodes (LEDs) provide the same warm, quality light you're accustomed to with traditional incandescent bulbs, but they use less energy and last up to 25 times longer.

- **Energy efficient.** LED products are up to 80 percent more energy efficient than conventional incandescent products.

Light quality. On a scale of 0 to 100, color rendering index (CRI) measures how well a light bulb displays colors compared to sunlight. Incandescent bulbs set the standard with a score of 100. The latest LED products have a CRI of up to 90, making the light in your home look vivid and natural.

Color tone. Bulbs emit light in different tones, ranging from cool (bluish) to warm (yellowish). Warm light creates a cozy atmosphere; great for your living room or bedrooms. Cool light is good for performing tasks, such as in your kitchen or workroom. Light tone is measured as correlated color temperature (CCT). Bulbs with a lower CCT have a warm tone, while a higher CCT means a cool appearance. LED products emit light throughout the color range, so they can be used all around your home.

Figure 1 – Indiana Michigan Power Claims

According to the US Department of Energy's website, energy efficiency means "using less energy to get the same job done."² The job is to provide uniform illumination with human-visible light. LEDs do not produce uniform illumination³, but rather they emit radiation from a flat surface which creates a non-uniform shape called a Lambertian and non-uniform illumination. Since LEDs do not do the same

¹ <https://www.indianamichiganpower.com/savings/home/newsletter/story?StoryID=593>

² https://www.energystar.gov/about/about_energy_efficiency

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

job as an incandescent or High-Pressure Sodium, **the claim that LEDs are energy efficient cannot be made.**

We will address each of Indiana Michigan Power’s deceitful and/or fraudulent claims here.

Claim 1: “Same Quality LEDs provide the same warm, quality light that you’re accustomed to with incandescent bulbs” – This is absolutely untrue. Notice in the image in Figure 2, from the utility company Eversource, that the distribution of the light is non-uniform. Incandescent bulbs emit uniform light. An LED light is not at all what humans are accustomed to. In fact, non-uniform visible radiation is so toxic, it causes epileptic seizures, migraines, and panic attacks.

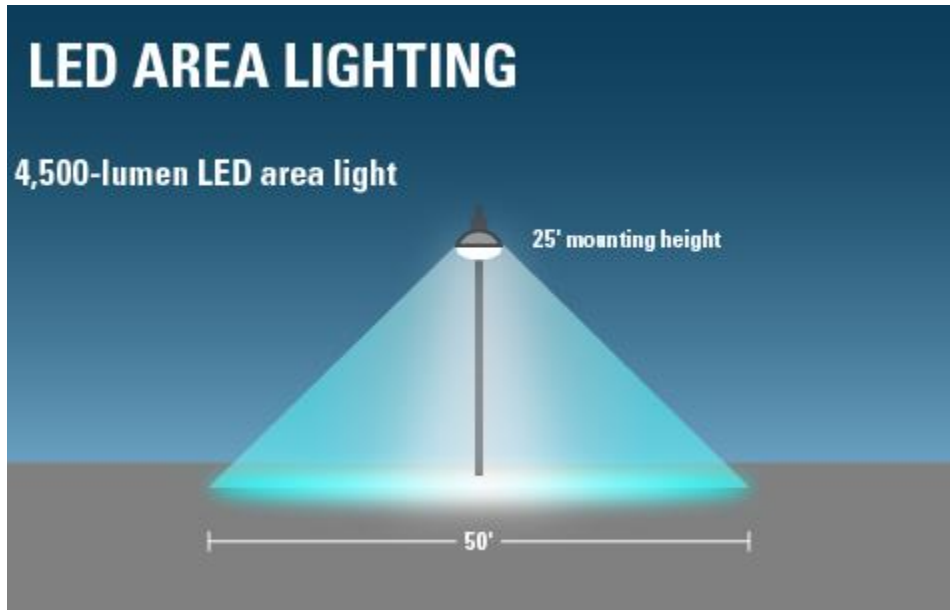


Figure 2 - LED Non-Uniform Distribution

Figure 3 is the spectral power distribution of a 2700 Kelvin LED light. Notice the peak of blue energy wavelength. Incandescent has almost no blue wavelength light, so again, the claim that LEDs provide the same warm, quality light that we are used to is not true.

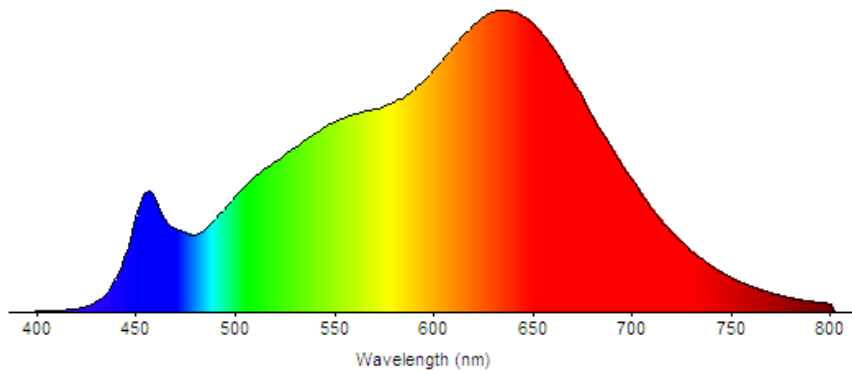


Figure 3 - 2700K LED

Claim 2: “Energy Efficient LED products are up to 80% more energy efficient than conventional incandescent products.”

As noted above, to claim energy efficiency, the new technology must provide the same service as the previous technology, using less energy. LEDs do not provide the same service as incandescent because LEDs produce spatially non-uniform light. Therefore, Indiana Michigan Power’s claim that LEDs use less energy than incandescent is false. A comparison simply cannot be made because the light types are different.

Claim 3: “Light Quality The latest LED products have a CRI of up to 90, making the light in your home look vivid and natural.” – LEDs do not produce natural light colors. Nothing about LEDs is natural. The spectral power distribution of LEDs shows a spike of blue wavelength light, and the light is non-uniform which is toxic for humans. This is not a natural light color.

LEDs are entirely inappropriate for illuminating a volume of space because the light is not uniform. Humans are adapted to uniform light reflecting from surfaces to detect object shape and color. The bullet-shaped beam of light from an LED does not uniformly illuminate and is not at all a beautiful light, as LED light causes epileptic seizures, migraines, panic attacks and other negative neurological reactions.

Claim 4: “Color Tone Bulbs emit light in different tones, ranging from cool (bluish) to warm (yellowish). Warm light creates a cozy atmosphere; great for your living room or bedrooms. Cool light is good for performing tasks, such as in your kitchen or workroom. Light tone is measured as correlated color temperature (CCT). Bulbs with a lower CCT have a warm tone, while a higher CCT means a cool appearance. LED products emit light throughout the color range, so they can be used all around your home.” – The Correlated Color Temperature of an LED cannot be accurately assessed as a single value because LED light is non-uniform. The use of any LED around the home can be toxic for certain individuals, and bulbs with a higher CCT do not emulate natural sunlight.

Spherical vs. Flat Surface Emitters

Figure 4 is a graphic on the website of the utility company Evergy.⁴ The graphic clearly shows the non-uniform energy distribution of LED flat surface light. Non-uniform flat surface light is unsafe.

⁴ <https://www.evergy.com/ways-to-save/resources-link/equipment/led-flood-and-area-lighting>

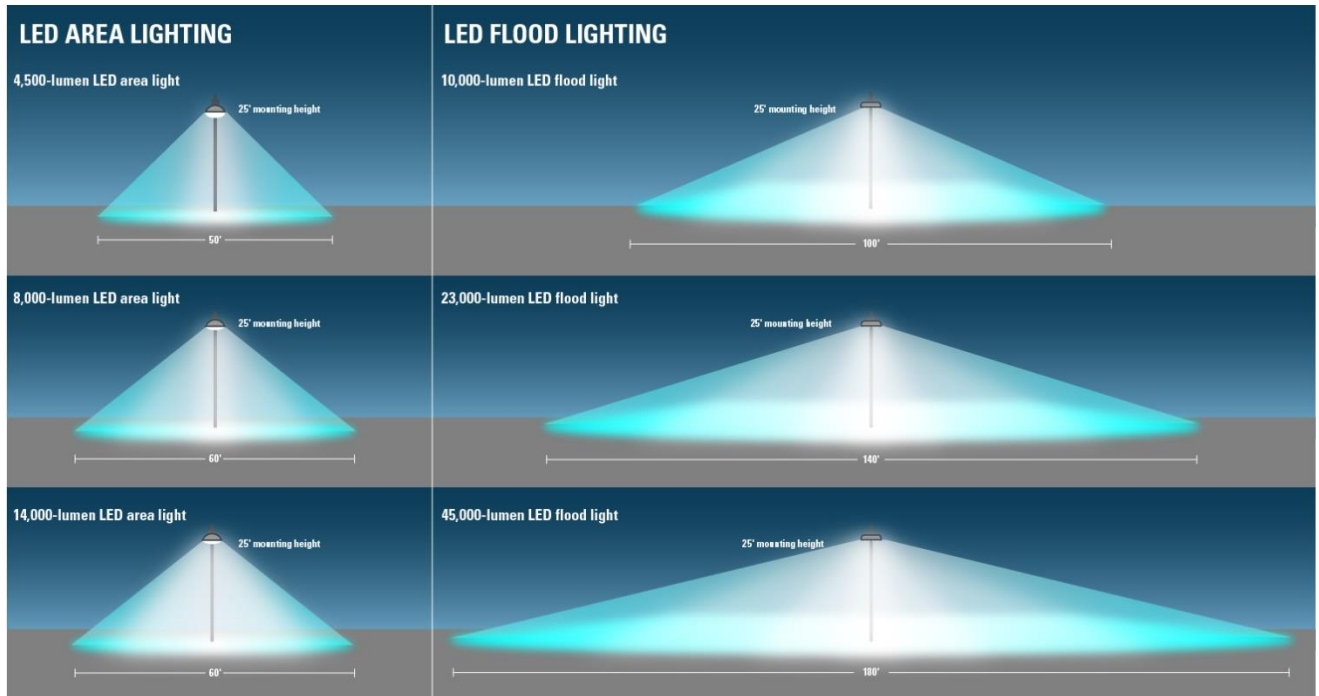


Figure 4 - LED Non-Uniform Light Distribution

LED light is not just regular light. The difference between regular light and LED light is that regular light comes from a spherical emitter, while LED light comes from a flat surface emitter. The differences between a spherical emitter and flat surface emitter must be understood by all Consolidated Energy leadership and staff.

The left side of Figure 5 shows light from a point source. The light is uniformly spread and follows the well-known Inverse Square Law.⁵

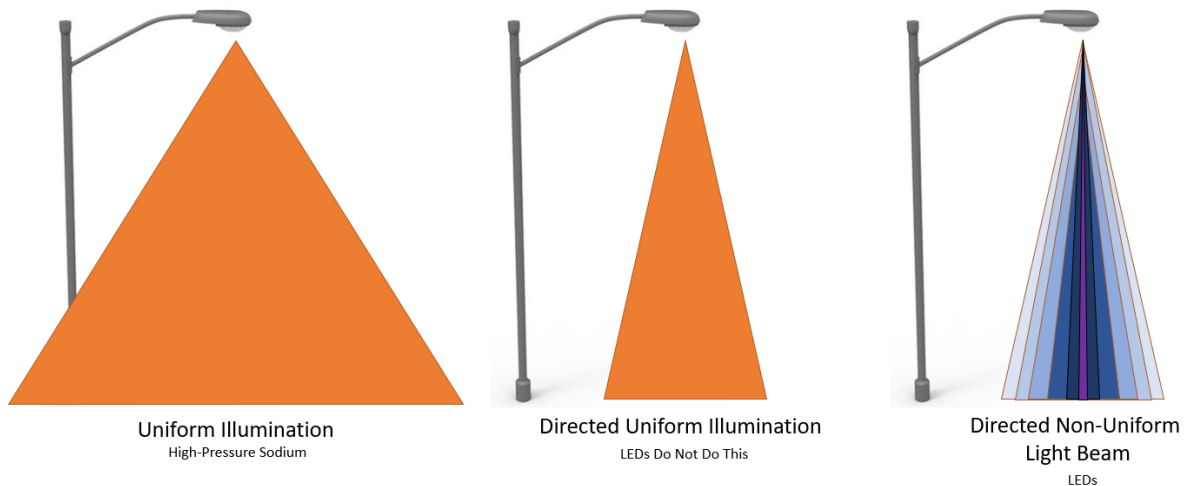


Figure 5 - Streetlight Comparison

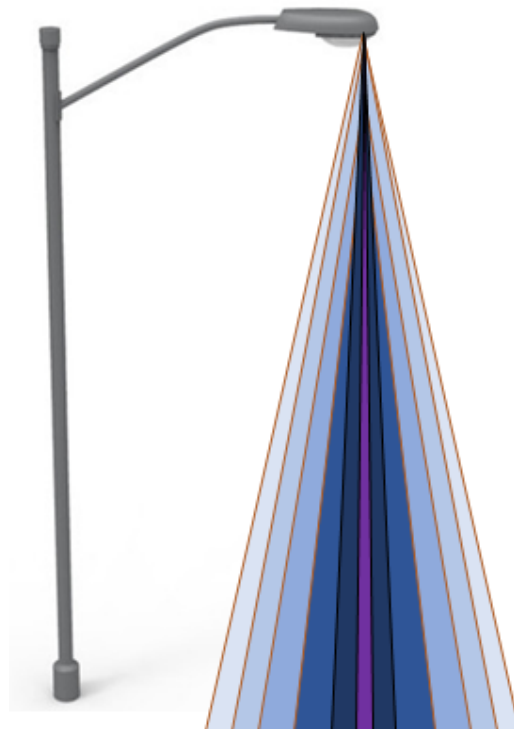
⁵ https://en.wikipedia.org/wiki/Inverse-square_law

Flat surface sources such as LED do not emit uniform light. Flat surface sources emit directed light beams, but those light beams are not uniform. The middle image in Figure 5 is **not** LED light, as claimed by Indiana Michigan Power.

The true shape of light from a flat surface is shown on the right in Figure 5. The energy is non-uniform, with the light beam being extremely dense in the center of the chip, and much less dense on the edges.⁶ This non-uniform light from the tiny source interferes with human nerve signaling because human nerves were only designed to receive signals that arrive with uniform energy.

Streetlights

Figure 6 highlights the issue of flat surface sources such as LEDs. The non-curved surface of an LED chip causes the emitted light beams to overlap, with the middle of the chip having an extremely dense light, and the edges of chip being much less dense. This creates a non-uniform spatial shape of light which is unfit for the purpose of illumination. Figure 6 shows that the beam directly below the streetlight will be blindingly bright, while the edges will have insufficient light. This type of light is unsafe and unfit for human vision.



**Directed Non-Uniform
Light Beam**
LEDs

Figure 6 - Directed Non-Uniform Light Beam

⁶ <https://ieeexplore.ieee.org/document/8879542>

None of the streetlight standards such as the Illuminating Engineering Society IES RP-8-18 Roadway and Parking Lot lighting are applicable to LED light beams. IES RP-8-18 is only applicable to point sources. IES falsely claims that LEDs are point sources, but as can be seen in the images from Evergy, LEDs do not emit uniform light and are not point sources. LED streetlights do not comply with any standards, and this is a major safety and liability issue for Indiana Michigan Power.

Figure 7 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 not meet the regulatory meaning of or comply with standards for the use of light as illumination.

Regulatory Meaning of Light and Illumination

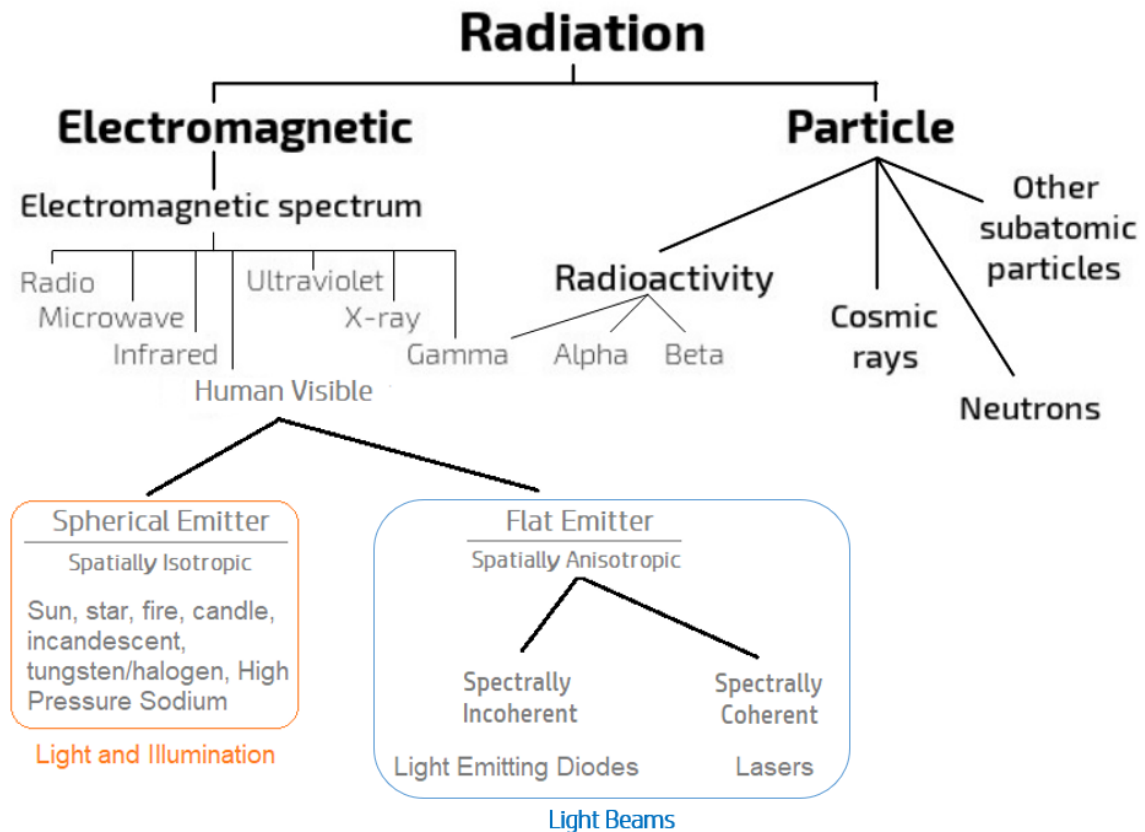


Figure 7 - Radiation Types

Eye Damage

LED light beams are dangerous for human eyes. For 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.” LED streetlights are even more powerful than a handheld

flashlight, but where is the warning label for babies in strollers looking up directly into an LED light beam?

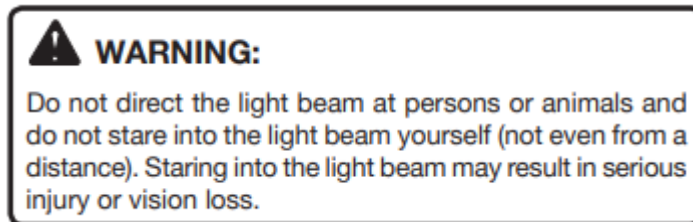


Figure 8 - Flashing Warning

Discrimination

One of the most tragic outcomes of using LED light beams is its effects on those who are LED-sensitive. This includes people with epilepsy, autism, migraines, PTSD, and other neurological conditions where the non-uniform energies of the LED light beams cause the nerves to overload and short circuit, resulting in epileptic seizures, migraines, panic attacks, anxiety, and agitation. Some of these heart-wrenching stories of how the widespread installation of LEDs have destroyed lives are posted on our website.⁷ LED lights are discriminatory because they interfere with a person's major life functions such as seeing, thinking, and concentrating. Here are a few quotes:

- **Epilepsy:** *I have epilepsy, and even the briefest glimpse of an LED light instantly throws me into a seizure."*
- **Migraines:** *The most distressing symptom from these [LEDs] is a burning sensation in the occipital area of my brain.*
- **Autism:** *I was crawling around on the ground, pulling the grass, pulling my hair, screaming.*
- **Lupus:** *I developed a sunburn-type rash to my face, neck, and chest with spontaneous bleeding to my lip.*
- **Irlen's Syndrome:** *Walking in the dark is horrendous because of these lights.*
- **Sjogren's Syndrome:** *Strobing LED lights are becoming so common on utility vehicles, and they cause me to go into a completely overloaded state where I can't think straight.*

Given that LED light is non-uniform, toxic, and discriminatory, Indiana Michigan Power must take the following actions.

- 1) Indiana Michigan Power must fully disclose that LED streetlights do not emit uniform light, and that LEDs do not save energy because they do not provide the same uniform illumination service as HPS.
- 2) Indiana Michigan Power must fully disclose the dangers of LED lights, including its impacts on those with epilepsy, migraines, autism, and PTSD.
- 3) Indiana Michigan Power must provide to cities an analysis of replacing 100-watt HPS with 50-watt HPS as an alternative to LED.

⁷ <http://www.softlights.org/stories/>

- 4) Indiana Michigan Power must notify the Federal Trade Commission of its false claims of energy efficiency and remove those false claims from its marketing materials.
- 5) Indiana Michigan Power must remove the toxic LED streetlights to protect human health and safety.

Sincerely,

Mark Baker

Mark Baker
President

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