Soft Lights Foundation

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February 27, 2022

BY EMAIL

Elaine O'Neal, Mayor
Durham, North Carolina
elaine.o'neal@durhamnc.gov

Re: The LED Fraud

Dear Elaine O'Neal,

We were asked to contact Durham to notify you and the council about the dangers of LED streetlights and LED lights in general. We understand that Durham has converted to LED streetlights which negatively impacted the residents of Durham. We can explain to you and the council why LED lights cause so much glare and light trespass, why LED streetlights are dangerous, and why residents would prefer purple LED streetlights over the harsh white version.

There are now two types of light in the world: point sources and flat surface sources.

Point sources are the types of light that we have evolved with, such as the sun, incandescent, and even High-Pressure Sodium. We measure the brightness of such light with the metric luminous intensity.

Flat surface sources are a new invention that has never before been seen in this world. Flat surface sources include LEDs and lasers. The non-curved flat surface emits non-uniform energy that cannot be considered a point source. The brightness of flat surface light is measured using the metric luminance. Flat surface light is toxic, hazardous, discriminatory, and unregulated.

Figure 1 is a slide highlighting the differences between the two types of light.

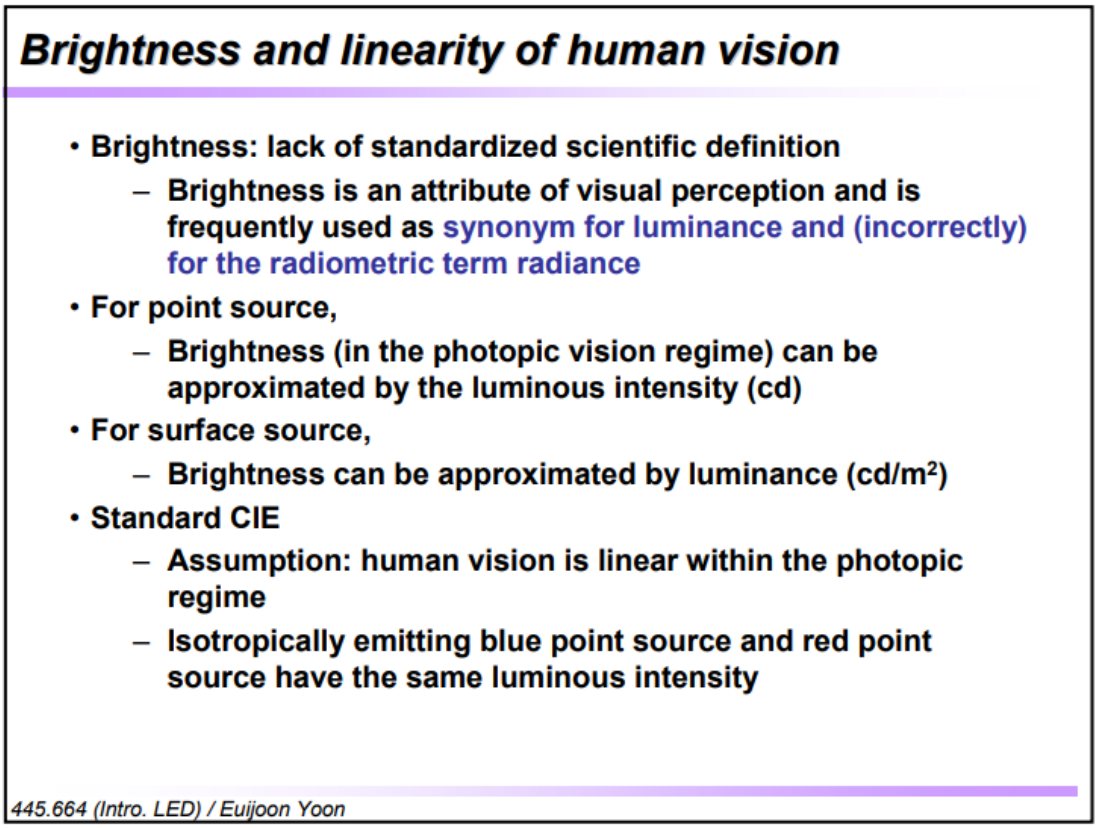

Figure 1 – Brightness of Two Source Types[1]

The differences between a point light source and flat surface light source must be understood by all involved, including council, city staff, and the public. Once the differences are understood, then the council, staff, and public can begin to discuss solutions to the glare, light trespass, health hazards, and discrimination of LED light beams.

The left side of Figure 2 shows light from a point source. The light is uniformly spread and follows the well-known Inverse Square Law.[2]

[1] Seoul National University - https://ocw.snu.ac.kr/sites/default/files/NOTE/791.pdf
[2] https://en.wikipedia.org/wiki/Inverse-square_law

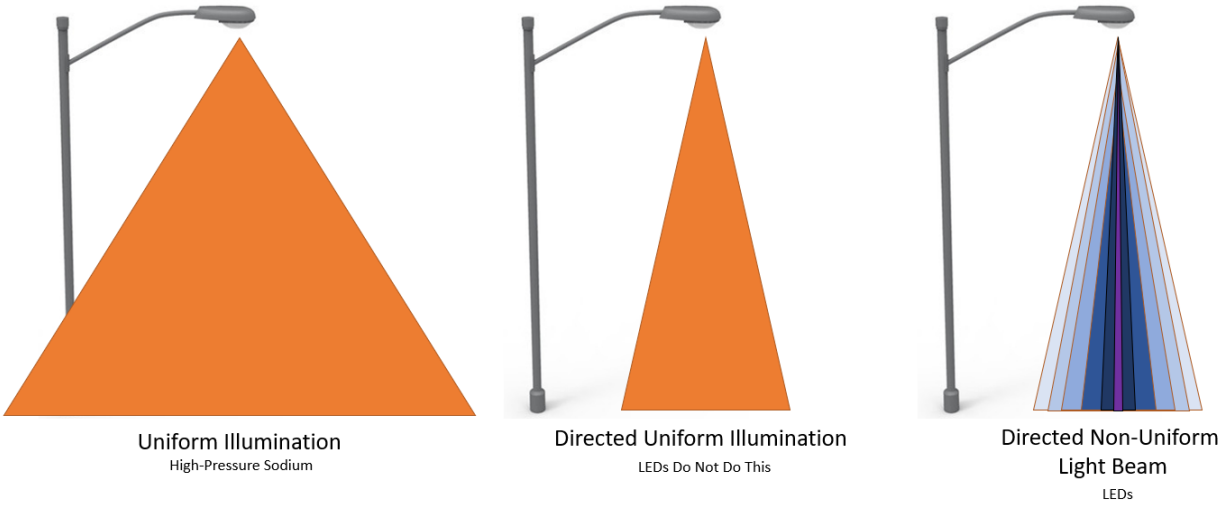

Figure 2 - Streetlight Comparison

What Duke Energy did not explain to Durham is that a flat surface source does not emit uniform light. Duke Energy likely told Durham that LED light beams are "directed", which is shown in the middle of Figure 2. While flat surface sources do indeed emit directed light beams, those light beams are not uniform. The middle image in Figure 2 is not the shape of LED light.

The true shape of light from a flat surface is shown on the right in Figure 2. 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.[3] 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.

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. What Duke Energy didn't tell Durham is that LED streetlights do not comply with any standards, and this is a major safety and liability issue for Durham.

Duke Energy also likely informed Durham that LED streetlights are "energy efficient". This is a fraudulent claim because, by definition, to be energy efficient, a new technology must provide the same service as the previous technology but using less energy.[4] Since flat surface sources don't provide the uniform illumination that the previous technology provided, flat surface sources cannot be compared to point sources in terms of energy use. Point Sources and flat surface sources are two entirely different categories of light, just like lemons and lemon-scented soap are two different products.

LED streetlights emit dangerous glare because of the large spike of 450 nanometer blue wavelength light. Figure 3 shows the spectral power distribution of a 4000 Kelvin LED. Notice the extreme peak of dangerous blue wavelength light.

[3] https://ieeexplore.ieee.org/document/8879542
[4] https://www.energystar.gov/about/about_energy_efficiency

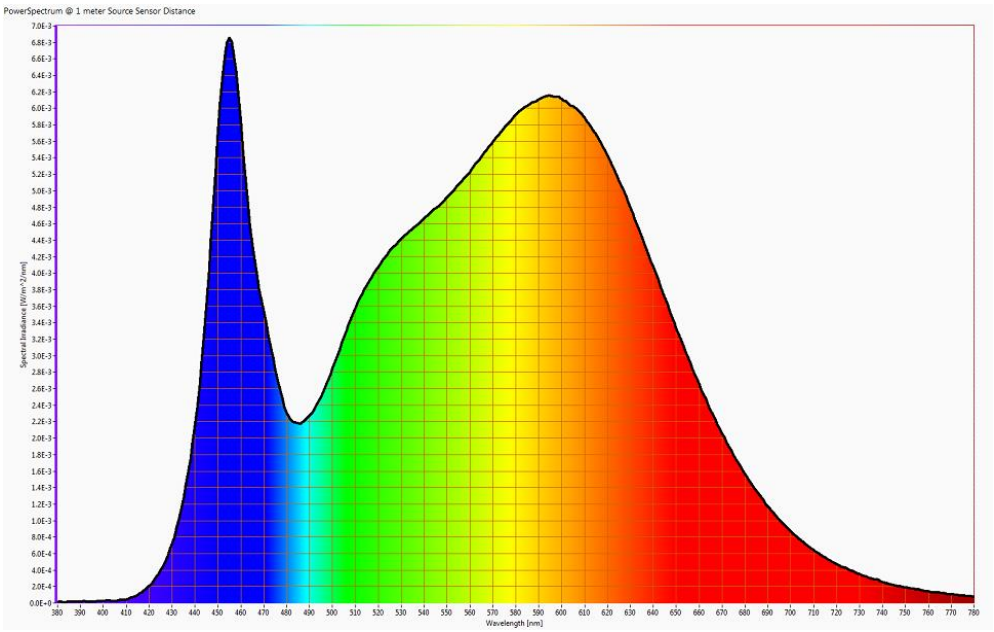

Figure 3 - 4000K Spectral Power Distribution

Figure 4 shows a Duke Energy purple/blue LED streetlight. Duke Energy claims that the reason their streetlights turned purple is because the yellow phosphor washed off. This is fascinating, because it's like opening the curtain in the Wizard of Oz and we can now see the fraud of LED streetlights. The yellow coating makes a fake white color, but the underlying energy is high-energy blue wavelength light that is toxic for the nighttime environment and humans and should never be used.

Figure 4 - Purple LED Streetlight

When we combine the non-uniform spatial properties and non-uniform spectral properties of LED light beams, we have a very dangerous type of light that puts community members at high risk because they can neither see nor be seen properly. This lack of uniform illumination and excessive blue wavelength light from LEDs is why the Durham community members are suffering so much. The only way to provide safe illumination is to use point sources such as incandescent or High-Pressure Sodium.

One of the most tragic outcomes of using LED light beams is its effects on those who are LED-reactive. 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 are posted on our website.[5] LED lights are discriminatory because they interfere with a person's major life functions such as seeing, thinking, and concentrating, and are causing some people to be unable to access public services or their place of employment.

The natural night is a fundamental resource that is critical to the health of humans and nearly all biological systems. Adding artificial light pollutes the natural night resource, resulting in significant increases in rates of cancer, premature births, and mood disorders.[6] We urge the Council to reconsider the use of artificial light and develop a long-term plan of protecting the natural night resource. The Soft Lights Foundation makes the following recommendations.

1) Duke Energy must remove the dangerous LED streetlights at their cost.
2) Develop a long-term plan to protect the natural night resource.
3) Use only tiny amounts of artificial light for wayfinding.
4) To prevent injury and discrimination, do not use flat surface light sources.

Our website (www.softlights.org) has a wealth of educational information that will help the council, city staff and the public understand the difference between a point source and a flat surface source. In addition, we are available to answer any questions you might have.

Sincerely,

Mark Baker

Mark Baker
President
Soft Lights Foundation
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[5] http://www.softlights.org/stories
[6] http://www.softlights.org/human-health/